

STADIUM CITY:
AN URBAN DESIGN PLAN FOR A TRANSIT-ORIENTED DEVELOPMENT AT THE TRUMAN SPORTS COMPLEX

by

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A REPORT

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Abstract

The design of a transit-oriented development (TOD) is a major concern with regards to its functionality and prospects for success. The Truman Sports Complex in Kansas City, Missouri, home of two professional sports venues, has a unique location on a proposed transit corridor, the Rock Island. This corridor is planned to run between downtown Kansas City and suburban Lee's Summit. Therefore, the Truman Sports Complex site is a natural choice for a TOD.

Building a TOD at the Truman Sports Complex will create a focal point on the Rock Island Corridor that connects Arrowhead and Kauffman Stadiums to downtown Kansas City and Lee's Summit via a regional transit system; bring together a diverse population through the creation of a walkable, mixed-use center located adjacent to the regionally known cultural institutions; and encourage new development

around the junction of Interstates 70 and 435, a major transportation node in Kansas City, Missouri.

This study, focusing on the design of such a project on this specific site, employs an extensive site analysis informing conceptual and specific planning ideas. It draws from a large body of literature and precedents, incorporating well established elements and principles into a new development that is both unprecedented in the Kansas City region and unique among TODs and sports-related districts.

The main findings reveal the desirability of a strategy to develop on the existing parking surface of the Truman Sports Complex and reroute the Rock Island Corridor through the middle of the site so that it passes between the two stadiums. The final plan incorporates a mixed-use program, with retail, entertainment, offices, and apartments, into a variety of building types, including garden apartment buildings, low- to mid-rise mixed-use buildings,

and high-rise towers, placed throughout the site in a compact, walkable grid pattern of streets.

The significance of this project is that it can inform the Mid-America Regional Council, the Jackson County Sports Complex Authority, and other relevant stakeholders about the potential for developing on this site, and it demonstrates that a mixed-use, pedestrian-friendly, large-scale transit-oriented development with a wide variety of program is both viable and desirable at the Truman Sports Complex.

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Preface

Stadium City is a collaborative project that Kevin Credit and I worked to develop. This document focuses on the work involved in the design process of Stadium City, which is my area of focus. Kevin's document focuses on the economic research and programming that was essential to this project. Many of the chapters contain text and ideas produced jointly, although the Site Analysis and Design Concept chapters are my own work, except for a diagram of a rail alignment. Likewise, the Regional Background and Development Program chapters are Kevin's work, with the exception of the jointly produced phasing plan image. The joint document, authored by both of us, includes all chapters.

This document begins with an introductory chapter that presents the regional and theoretical contexts of this project. The second chapter focuses on research questions and design problems. The third chapter presents all of the information from the site analysis

that I conducted as one of the main research components informing the project's design. The fourth chapter discusses the conceptual principles of the design, drawing from the theoretical background and the specific challenges of the site. It includes several goals, an example of the type of development planned for the site, and the basic areas determined for the development's various land uses. The fifth chapter presents the final design plan at the greatest level of detail developed for the project. It includes an extensive explanation, street types, and specific zoning categories. The sixth chapter summarizes our work, and the seventh is my personal reflection on the process. Chapter 9 is an appendix containing my background research in the form of a literature and a set of precedent studies.

This document should inform readers about the potential of the Truman Sports Complex site, given its position on the proposed Rock Island transit corridor. The research, analysis, recommendations, and conclusions presented herein provide a backdrop for future decisions regarding the development of this site.

I. Introduction

By Kevin Credit and Alfred Ledgin

The Mid-America Regional Council (MARC) has created a set of plans for the Kansas City region, notably including *Transportation Outlook 2040* and *Creating Sustainable Places*. Through this process MARC has identified a former rail corridor, the Rock Island Corridor, as a future public transit route to serve transportation needs in Jackson County, Missouri. The Truman Sports Complex, which houses the venues for the Kansas City Chiefs and Royals football and baseball teams, is in a strategic location along this corridor. The site offers potential for new development, since it will be an important stop on this transit line. This document presents an urban design plan for a transit-oriented development on the Rock Island Corridor, adjacent to Arrowhead and Kauffman Stadiums in Kansas City.

Dilemmas

This development plan addresses several dilemmas, some pertaining to the Kansas City region in general and others pertaining to the Truman Sports Complex

in specific. The following issues have guided this planning process from the idea's conception through to the final design plan, and they have framed the dilemmas in ways that offer potential for concrete resolutions.

As Galina Tachieva states in the opening paragraph of the *Sprawl Repair Manual*, “sprawl is a pattern of growth characterized by an abundance of congested highways, strip shopping centers, big boxes, office parks, and gated cul-de-sac subdivision—all separated from each other in isolated, single-use pods” (2010). This definition describes the current character of much of the Kansas City metropolitan area. The region continues to grow ever-outward, largely ignoring substantial opportunities for redevelopment around existing communities that would better utilize current infrastructural investments than greenfield development on the exurban fringe.

In addition, this pattern of dispersion has largely separated each of the region's most important cultural

and activity centers, limiting the possibility of benefits from the economies of scale and agglomeration around these institutions, and, at the same time, ensuring that car ownership, vehicle miles traveled (VMT), and automobile dependence will all continue to increase. The effects of this geographic fracturing—sponsored by the automobile-oriented landscapes often considered placeless—have also exacerbated the social, economic, and racial segregation that still exists between various sectors of the population. Unfortunately, these specific problems continue to exist against a backdrop of rising fossil fuel prices, carbon emissions, and other potential negative externalities from climate change—complex environmental problems that transcend the ability of one locality to address them fully.

The auto-oriented character of Kansas City and its environs, and the near-universal automobile reliance that comes with it, are both entrenched in over half a century of tradition. Higher-density, well connected, mixed-use development requires favorable market conditions and a range of viable transportation

options. Kansas City's dilemma then becomes a choice between the comfort in continuing familiar patterns of use-separated, car-dependent development, and the risk in pursuing new forms that would combine commercial, entertainment, and residential uses, once deemed incompatible, in strategic centers that would foster human energy and urban vitality, and could forever alter the image of the city itself.

A dilemma pertaining to the Truman Sports Complex site specifically is the question of the alignment of the Rock Island Corridor. The corridor passes through the southwestern side of the site, in a wooded ravine that is physically and spatially separated from the two stadiums in a significant fashion. The option of building the transit line on the corridor's original path raises the problem of the convenience of pedestrian access between the transit line and the stadiums. However, the investment of relocating the line between the stadiums would create added convenience for transit riders and would activate the

space in a new way that would change the potential for development configurations around the stadiums.

Thesis

Creating a diverse, age-comprehensive, and environmentally sustainable Transit-Oriented Development (TOD) at the Truman Sports Complex will create a focal point on the Rock Island Corridor that serves to: a) directly connect the stadiums to both downtown and suburban Lee's Summit by means of a rail transit system, thus providing greater regional connectivity and imageability while fostering a reduction in auto mode share, b) provide a catalyst for social cohesion through the creation of a walkable, mixed-use center that integrates and expands upon the powerful cultural institutions of the Kansas City Royals and Chiefs—bringing people from diverse ages and backgrounds into face-to-face contact with one another in a well designed public space, and c) provide a spark for redevelopment around the massive existing investments in regional infrastructure that are I-70 and

I-435—both of which are located near the proposed path of the light rail line in the stadium vicinity—providing a regional-scale transportation node.

Boundaries

The geographic boundary for the project will contain the existing Truman Sports Complex (see Figure 1.1), the location of the potential Rock Island rail line connection nearest the Complex, and a small buffer of the surrounding community. The research will focus on the following theoretical topics: basic TOD design principles, stadium location/design criteria, economies of scale (especially relating to cultural uses), theories of retail markets, urban design fundamentals and compact design, as well as the essentials of site planning (density, use mix, topography, etc.).

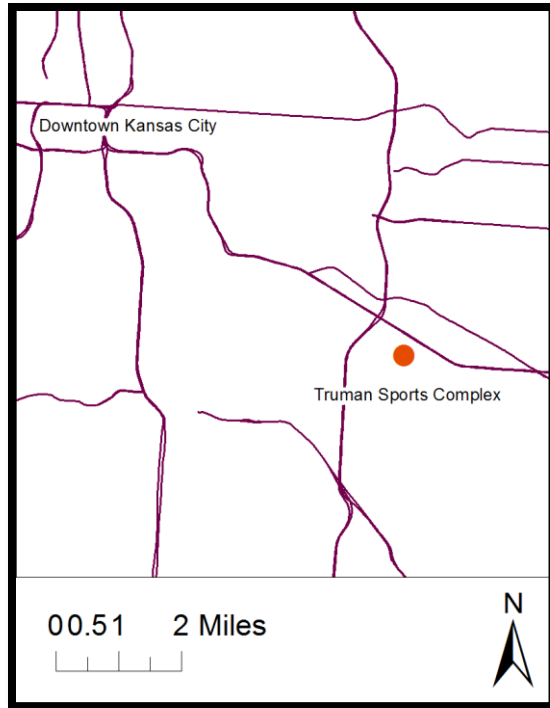


Figure 1.1. *Location of the Truman Sports Complex.*

Planning Principles

In order to delineate the philosophical foundations of this project, we have provided a list of planning principles that will provide the focus to our design strategies and research, and inform our final products. While informed by a variety of thinkers, including Kevin Lynch, Donald Shoup, Peter Calthorpe (the originator of the TOD idea itself), and others, the following list of principles is nowhere near comprehensive. However, it does provide a starting point for investigating the means to achieve the solutions stated in our Thesis:

- Focus on pedestrian connectivity (no “loops” or “lollipops” in street design) and maximization of the imageability of the site concept (Lynch 1960).
- Provide a diversity of uses, housing types, and amenities for a variety of age groups (Ditmar, Ohland and Calthorpe 2004).

- Include pedestrian-focused retail, a grocery store, possibly a school, and other public amenities that allow the residents to meet the majority of their needs within a short walk (Ditmar, Ohland and Calthorpe 2004).
- Solve the parking problem: provide garages, decrease relative parking supply, and meter public parking, providing those funds for community maintenance expenses (Shoup 2005).
- Include Complete Streets design standards.
- Provide the requisite density for financially viable transit operations (Guerra and Cervero 2011).
- Provide a detailed plan for future build-out of the site, including scale, form, setbacks, structure bulk, and specific design details.

Project Relevance

The Mid-America Regional Council's (MARC) Creating Sustainable Places initiative focuses on a “shared regional vision” that encompasses all phases of economic, social, and environmental sustainability. The proposed stadium TOD will fulfill the agency's implementation strategy of “demonstrating new models” by applying a sustainable design form to a key corridor (the Rock Island) and activity center (the Truman Sports Complex), and providing a concrete demonstration project that works to “...help transform the ways neighborhoods and communities grow and develop” (Mid-America Regional Council 2011a, 7) as outlined in the Thesis above (see MARC's *Creating Sustainable Places*, p. 6, for an additional detailed description of the desired features of activity centers). This project is relevant to the contemporary practice of landscape architecture and city planning because of their focus on designing the built environment for long-term sustainability and their interest in mixed-use centers and equitable transportation systems.

Probable End Product

The end product will be a site plan for a diverse, age-comprehensive, human-scaled, and environmentally sustainable TOD at the Truman Sports Complex that incorporates the following elements: connection to the Rock Island rail transit line, existing plans, regulations, and policies and their relationship to the project, topography, retail development principles, street layout/internal circulation, density, proposed mix of uses, history of the site, transportation impacts projected from the site, and connections to existing communities/development. The likely form of this product will be a series of drawings/diagrams (likely using ArcGIS, AutoCAD, Google SketchUp, and Adobe Photoshop) displaying the various designed and existing conditions of the site, as well as supporting documentation exhibiting background research, theoretical underpinnings, and the methods employed.

Relationship to Stakeholders, Clients, and Agencies

Our relationship to MARC will be one of reciprocity—we will obtain much of our data from this agency, and we intend to fashion our project in ways that are suggested by MARC's desire for demonstration models. However, our interest in this site and background research extends far beyond the scope of Kansas State's involvement with MARC, and we plan to pursue principles and ideas that we find interesting personally, whether or not MARC specifically plans to parallel them. We present Stadium City as a plan for future development. We believe MARC and the other actors involved will be able to use this plan as part of a comprehensive visioning processes that addresses the future of the Truman Sports Complex site. We intend to share the data that we compile freely with any and all stakeholders that are interested, but the unique elements of our design are not necessarily intended to be freely copied or twisted to fit another context or for another purpose.

Regional Background

Kevin conducted an analysis of the Kansas City region, which shows the relevant economic, transportation, and land use factors pertaining to the context of Stadium City. His analysis shows that the fastest-growing activity nodes in the region exist outside of the region's areas with the highest concentrations of population and employment. The region's freeway network, a set of high-capacity automobile infrastructure, connects these activity nodes, as well as the Truman Sports Complex. The region's older, incrementally developed activity centers have proximity to high concentrations of business activity but not to high residential densities. Most of the area's regional shopping centers lack mixed-use program and are predominately retail-based. Except for the centers closest to downtown Kansas City, most of the region's centers are widely dispersed. Furthermore, the area has a lack of express regional transit service.

These considerations reveal the niche that a transit-oriented development at the Truman Sports Complex will fill. Please see Kevin Credit's *Stadium City* document, or the jointly produced *Stadium City* document, for the full regional background analysis.

II. Questions and Methodology

By Kevin Credit and Alfred Ledgin

Design Problems to Address

In the course of delineating the definition of our project, additional dilemmas, questions, and potential solutions have been raised. Here, we present a beginning of the iterative, research-based design process that will allow us to achieve “...even greater and more sustainable beauty and utility” (Brandt, Chong and Martin 2010):

- The layout of the Truman Sports Complex features Arrowhead and Kauffman Stadiums as its centerpiece, with the stadiums positioned at a 45-degree angle to the north-south and east-west axes. The site is encircled by a curvilinear ring road that seems to bear no relation to the stadiums or the surrounding land but provides for the needs of automobile circulation on game days. Our goal is to incorporate a permeable street grid to the fullest extent feasible. The disparity between the site's geometry and a desirably oriented

street pattern creates a significant design problem that we address in the conceptual stages of our plan.

- The sports complex has thousands of parking spaces specifically serving events held at the stadiums. Any new development on the site would add to the total parking requirement. One of the largest problems this plan addresses is the need to provide sufficient parking while designing a layout that is conducive to pedestrian activity.
- Pedestrian connectivity is one of the main goals for this site design. Although creating a well connected pedestrian network within a compact TOD may be a simple task, this plan also addresses the issue of connecting the TOD's pedestrian network to the neighboring development across Blue Ridge Cutoff.
- As it exists the site is designed for efficient automobile circulation. As we introduce a

pedestrian-friendly, transit-oriented development to this site, we encounter the problem of maintaining safe, efficient vehicular access. The design of Stadium City's transportation system addresses this problem in various ways.

Research Questions

Topic: Transit-Oriented Development at the Truman Sports Complex

Area of Study: Sustainable Communities along the Rock Island Corridor in Kansas City

We are primarily studying urban design and its application to a transit-oriented development (TOD) at the Truman Sports Complex. **We want to investigate which urban design principles are the most essential to a TOD at the Truman Sports Complex.** This question is significant to our conceptual understanding of how to design a successful TOD in a regional node that would bring several different land uses into close

proximity. The case for TOD is already clear, as typical suburban densities tend not to attract enough riders for viable suburban transit systems, and “[m]any suburban [transit] corridors can achieve a ridership that will make the system operationally efficient only through Transit Oriented Development” (Calthorpe and Fulton 2001, 218). A new TOD also provides an opportunity to implement green (energy-efficient and environmentally conscious) urbanism, which, when applied to a TOD, can result in a 30 percent reduction of carbon emissions and energy consumption when compared to conventional development (Cervero and Sullivan 2011).

We are also studying land use planning, which has an interest in optimizing the use of land and buildings in TODs. **We want to determine what residential density, number of dwelling units, mixture of dwelling types, amount of office space, amount of retail space, and mixture of commercial and public amenities would provide the best opportunity to make a TOD at the Truman Sports Complex**

economically successful. This question is significant to the development of a TOD that attracts transit riders because the development's land use characteristics are of primary importance to its viability. The "... 3Ds ... density, design, and diversity ..." (Tumlin, Millard-Ball, Zucker, and Siegman 2003, 14) constitute a general principle for TOD, but a quantitative measure is necessary for an individual development. This research will focus on specific examples of built TODs, including those in San Diego, "... a possible 'best case' example of TOD implementation" (Boarnet and Compin 1999, 81), and Orenco Station in Hillsboro, Oregon, "... one of the most promising examples of [TOD] in the US" (Bae 2002, 9).

Methodology and Project Overview

As shown in Figure 2.1, our methodology consists of conducting an extensive market analysis, composing a development program, undertaking an in-depth analysis of the Truman Sports Complex site, establishing a set of conceptual principles driving the

site plan, and developing the final plan itself, which delineates the essential configurations necessary to initiate the project's implementation. The following chapters present each of the stages of our process in detail. These components connect the issues that define the problems of and solutions to the characteristics of the Truman Sports Complex site and its regional context.

As discussed in the following chapters, Stadium City—the working name for the Truman Sports Complex TOD—has several important qualities that make it unique not only to the Kansas City region but also in the context of mixed-use developments and TODs nationwide. Stadium City introduces a new type of development to the Kansas City region and thus offers area residents a new choice in neighborhood and housing type. As a pioneering TOD in the region, this development will give people the opportunity to live within an easy walk from both a rail transit station and several retail and entertainment amenities, and it will give people a new choice of commuting mode, as the

Rock Island Corridor will be a natural choice for workers commuting between eastern Kansas City, downtown, Raytown, and Lee's Summit. Furthermore, it will create a unique sense of place in Kansas City—one in which the landmark identity of the stadiums and mixed urban development will spatially define an area that shapes people's lives and to which they may form a strong personal attachment. The new walkable place will allow people to meet via chance encounters in active public spaces, which can spur the process of exchanging ideas—one of the very activities that define urban centers as hubs of culture and innovation.

In terms of mixed-use, transit-oriented developments that have been built in the U.S., Stadium City is unique for two reasons. First, it is an unprecedented, close pairing of professional sports venues and mixed-use development in a suburban context. While many downtown redevelopment districts have been built adjacent to downtown stadiums, developments that serve suburban stadiums tend to be separated by a distance that reduces the

potential for interaction between the two. As shown in the plan, Stadium City puts shops, restaurants, offices, apartments, and other program immediately next to, and even between, Arrowhead and Kauffman Stadiums, with buildings separated from the stadiums by as little as the width of a street or pedestrian path. In addition this development introduces high-rise towers and juxtaposes them with low-rise, garden-style apartment buildings and a general suburban setting. This dramatic interplay between building heights is rare among the standard, often formulaic, breed of suburban TODs that rarely break the mid-rise barrier. This development is not only one that functions for a diverse range of purposes but is also a project designed for visual stimulation, to excite the residents, office workers, stadium visitors, and shoppers who use, pass by, and pass through the site on a daily, weekly, or even occasional basis. Stadium City will create a special experience for anyone who arrives on this site, regardless of that person's intentions or expectations.

The Rock Island Corridor is one of the greatest factors in making this project viable and worthwhile. Because MARC has planned for the transit corridor to pass through the sports complex, it activates the space that would otherwise likely remain a large single-use development that is vacated for most days of the year. MARC's (2010) regional *Transportation Outlook 2040* plan maps a strategy of placing activity centers along the various corridors. According to the plan, the Truman Sports Complex is a Regional Commercial Center, located at an important point along the Rock Island Corridor. With this regional planning agenda already established, the additional consideration of Kansas City's regional growth and the relatively central location of the Truman Sports Complex site provide another reason for the desirability of transforming the 594-acre site from a space mostly for parking to a node for regional program. The combined forces of MARC's regional vision and the Truman Sports Complex's potential as a site for intense development set the stage for an innovative activity center that will bring new urban energy to the Kansas City region.

Process Diagram

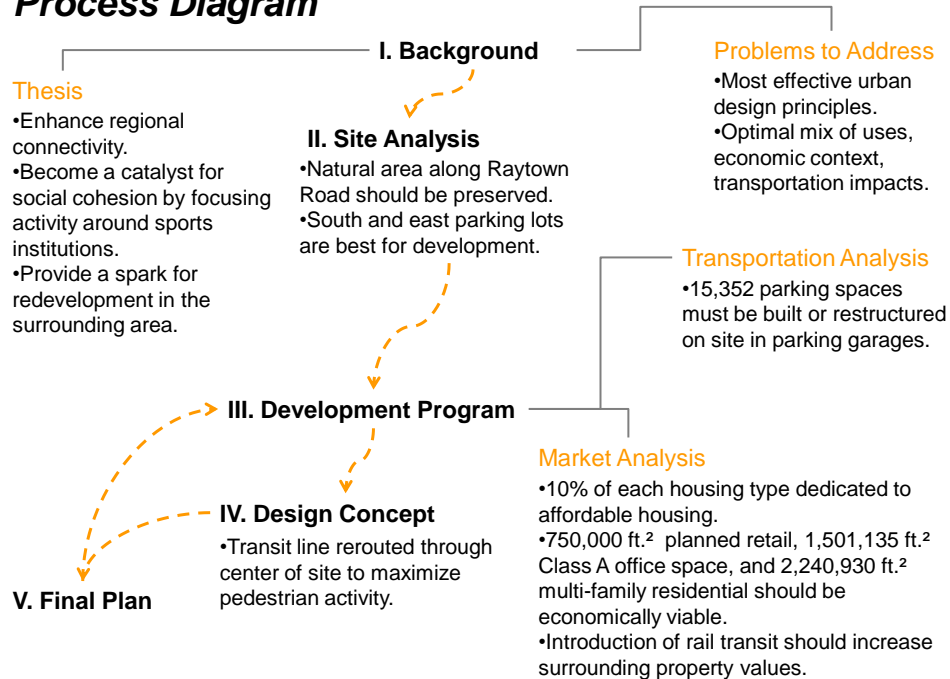


Figure 2.1. Process diagram.

III. Site Analysis

By Alfred Ledgin

This analysis addresses the scale of the Truman Sports Complex site itself, as well as the surrounding land within a one-mile radius of a central point between the two stadiums. It focuses on natural site characteristics, surrounding land uses, and relevant infrastructure. One of the main purposes of this site analysis is to develop a list of priorities for location decisions in our TOD design. We have identified the following 15 priorities, in order from most to least important:

- Automobile access to Interstate 70
- Automobile access to Interstate 435
- Automobile access to Blue Ridge Cutoff
- Automobile access to Raytown Road
- Pedestrian access to the transit station
- Pedestrian access to the stadiums
- Keeping development out of floodplains
- Minimizing environmental impacts, such as tree loss
- Concentrating different elements within the TOD and minimizing edges

- Traffic safety
- Maximizing natural amenities
- Developing on a low slope (less than 10 percent)
- Pedestrian access across Blue Ridge Cutoff
- Minimizing the need for grading
- Minimizing the need to build parking garages

The maps included in this chapter show the site and all of its infrastructure, including the Rock Island Corridor and its transit station, either as they currently exist or as indicated in the latest MARC proposals at the time of this writing. One exception is Figure 3.15, which shows our proposal for realigning the Rock Island Corridor, because the map displays the locations of bedrock that might affect the routing of any vertical realignment.

Site Characteristics

The Truman Sports Complex is a 594-acre, single-owner property that contains two professional sports

stadiums and a great expanse of parking surface—19,200 paved spaces plus room for an additional 6,800 cars to park on the grass (Kansas City Sports Commission 2008; Jim Rowland, email message to author, Jan. 17, 2012). The sports venues, Arrowhead and Kauffman Stadiums, are two iconic structures that have served as the centerpiece of the site since their construction in 1972 and 1973 respectively. Arrowhead is 260 feet tall, while Kauffman Stadium is 150 feet tall (Emporis 2012). The two stadiums are the tallest structures within eyeshot of the site, and the only buildings with near adjacency to the site that rise above low-rise level are three hotels—the Clarion Hotel, the Drury Inn, and the Holiday Inn—and the Fellowship of Christian Athletes Building on the north side of Interstate 70. Furthermore, numbers alone cannot fully express the vastness of the site. The site is too large to walk in a reasonable amount of time for everyday needs, and thus, a transit-oriented development would need to be concentrated on a select portion of the site.

The ways in which people view the site create interesting relationships with transportation modes. Most game attendees, many of whom reach the site via Interstate 70, likely view the northern portion of the site as the front side of the Truman Sports Complex. With Kauffman Stadium facing Interstate 70, this relationship gives the home of the Kansas City Royals visual prominence as the face of the sports complex for many visitors and passers-by. In contrast, upon the operation of the Rock Island transit line, rail transit riders will view the southern portion of the site as the front side of the complex. Building heights notwithstanding, this new relationship will elevate Arrowhead Stadium to the status of a new face of the Truman Sports Complex for many visitors and passengers. The additional transportation mode will essentially give the site two front sides and will significantly alter what people once considered the rear side.

Please note that this site analysis examines a range of scales. The largest scale examined here is a one-mile

radius around the center of the sports complex, and this is used for analyzing surrounding land use characteristics. The middle scale is the sports complex property, which, approaching a square mile in size, is an extensively large site encompassing a variety of land characteristics and unique features. The smallest scales of analysis will focus on specific portions of the site, such as portions of the parking lot, as well as the undeveloped land between the parking lot and Raytown Road, which includes the portion of the Rock Island Corridor that runs through the property.

One issue of concern at the site scale is the presence of power lines, which run through the undeveloped portion of the site. These include both high-voltage and standard electric lines. Relocating the high-voltage power lines underground may impose an undesirable cost, and thus, these lines are a potential obstacle to development on the site. Please see Figure 3.2 for the location of the high-voltage power lines, as well as Figure 3.1 for a visual example of one of the high-voltage utility poles.

A smaller-scale site feature of great importance is the presence of trails for walking and bicycling. A network of curvilinear, unimproved (dirt) trails exists between the Rock Island Corridor and Raytown Road, almost centrally located between the two entrances to the sports complex on Raytown Road. In addition, a relatively wide trail extends from the south side of Arrowhead Stadium southwest to Raytown Road, beginning at the sports complex ring road (officially named Dubiner Circle), running through a wooded area along the Rock Island Corridor, turning at an open field, and then running sharply downhill to its end at Raytown Road, immediately east of Lancer Lane. This trail, though not officially designated as such, appears wide enough to accommodate both bicyclists and pedestrians, and thus, it is a natural candidate for an improved trail on the site. The wooded area on the southern side of the sports complex site, the existing trails, and some small open fields, all of which exist in the space between Raytown Road and the southern side of the parking lot, are natural amenities that have potential recreational value for residents and visitors to

the site. Please see Figure 3.2 for locations of these features and Figure 3.3 for a series of site photographs showing the proposed new trail.



Figure 3.1. *High-voltage power line.*

Truman Sports Complex Site Characteristics

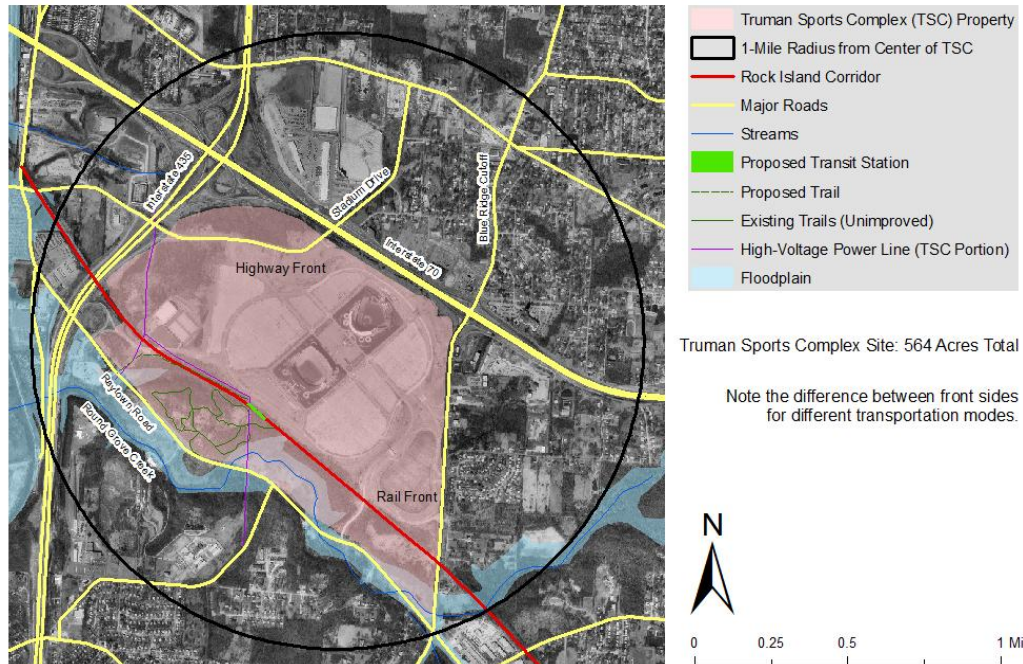


Figure 3.2. Truman Sports Complex site characteristics.

Photographs Taken along Proposed Trail*

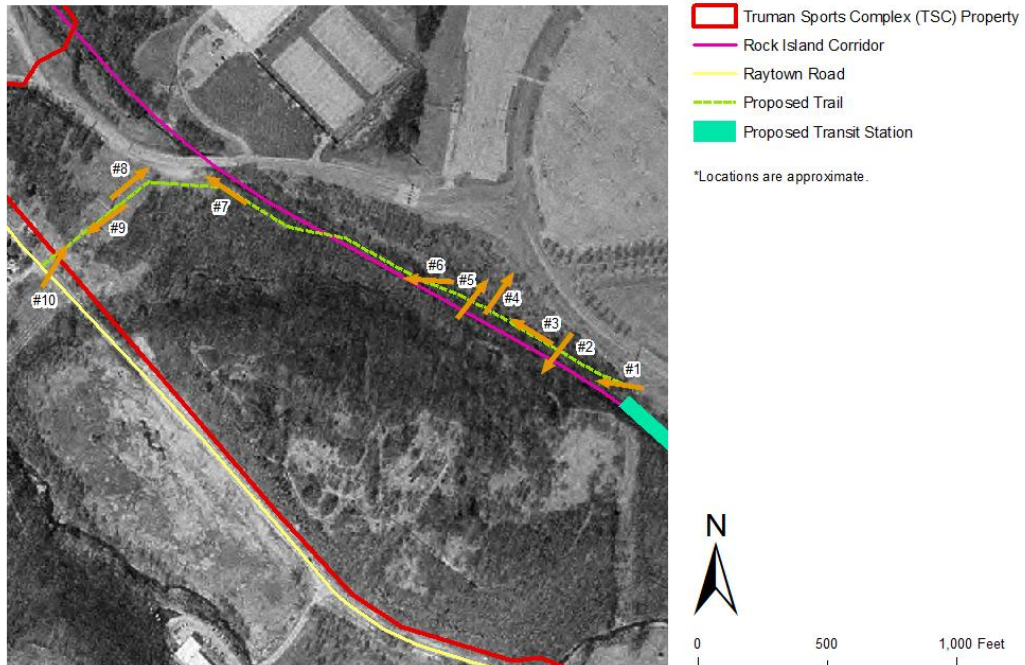


Figure 3.3. *Photographs taken along proposed trail.*



Figure 3.3a. *View of trees along trail.*



Figure 3.3b. *View of rock outcropping from trail.*



Figure 3.3c. *View of power lines along trail.*



Figure 3.3d. *View of landform along trail.*



Figure 3.3e. *View of vegetation along trail.*



Figure 3.3f. *View of Rock Island rail line from trail.*



Figure 3.3g. *View of clearing from trail.*



Figure 3.3h. *View of training facility from clearing.*



Figure 3.3i. *View of Raytown Road from trail.*



Figure 3.3j. *View looking uphill along trail.*

Elevation and Slope

The Truman Sports Complex appears to be a mostly flat site, and while that generalization holds true for the parking surface, the topography of the undeveloped portion of the site is quite different. The elevation of the land within a mile of the site's center lies within a range of 220 to 320 meters. Most of the parking surface lies within a range of 250 to 270 meters in elevation. One noteworthy characteristic of the parking surfaces is that the lot immediately to the east of Arrowhead Stadium lies roughly at the same level as the stadium, while the lot to the south of Arrowhead and the satellite lot on the southeastern side of the site are noticeably below the ground level of Arrowhead. Some of the topography of the parking surface is the intention of design, as most of the sports complex parking lot was designed so that stormwater runoff would flow from the main parking lots *toward* the stadiums, emptying into storm drains centrally located on the site (Graber 2010).

The undeveloped area between the southern side of the parking lots and Raytown Road includes many drastic slopes and elevation changes. Kevin Lynch and Gary Hack (1984), in the book *Site Planning*, present several guidelines regarding slope ranges. They warn the slopes under one percent drain poorly, but they suggest that slopes under four percent seem flat and allow intense activity of all varieties. The authors note that slopes between four and 10 percent “. . . are easy grades, suitable for movement and informal activity” (Lynch and Hack 1984, 40). Lynch and Hack advise a gradient between one and 10 percent for roads, since vehicles normally have a climbing limit of approximately 17 percent, while pedestrians have a limit between 20 and 25 percent. The authors also note that slopes over 10 percent, which are seemingly steep, “. . . can be actively used only for hill sports or free play” (Lynch and Hack 1984, 40). Erecting buildings on steep slopes can offer advantages, however, such as views and entrances on different levels, but their construction is more expensive, due to “. . .

complicated foundations and more difficult utility connections” (Lynch and Hack 1984, 40).

Very little of the ground contained in the portion of the site between the parking lots and Raytown Road has a slope of less than 10 percent. In fact, many areas with slopes of around 50 percent exist on that part of the site. For an area that rarely exceeds a quarter of a mile in width, the elevation changes are quite severe. The area immediately to the south and west of the proposed rail transit station has an elevation range of approximately 30 meters, excluding the floodplain (MARC 2011b; USDA, Service Center Agencies 2011). The typical characteristics of the southern portion of the site consist of steep hills that rise suddenly, just north of Raytown Road, climbing toward the Rock Island Corridor. Furthermore, much of this area contains large rock formations. Thus, development in this area would require extensive grading and probably blasting. Please see Figures 3.4 through 3.11 for detailed representations of the site's elevation and slope at different scales. The proposed transit station sits

below the level of the parking lot immediately south of Arrowhead. This presents a design challenge for access between the station and the stadiums, as well as for development surrounding the station.

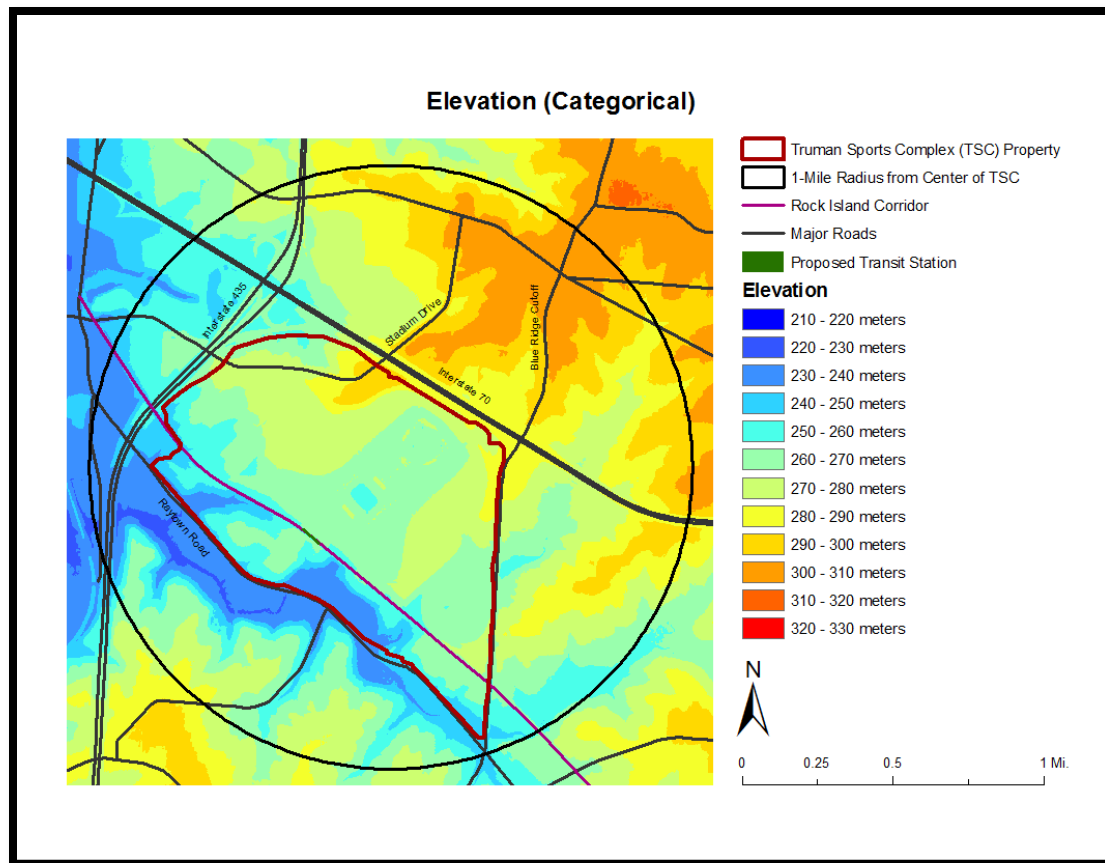


Figure 3.4. *Elevation.*

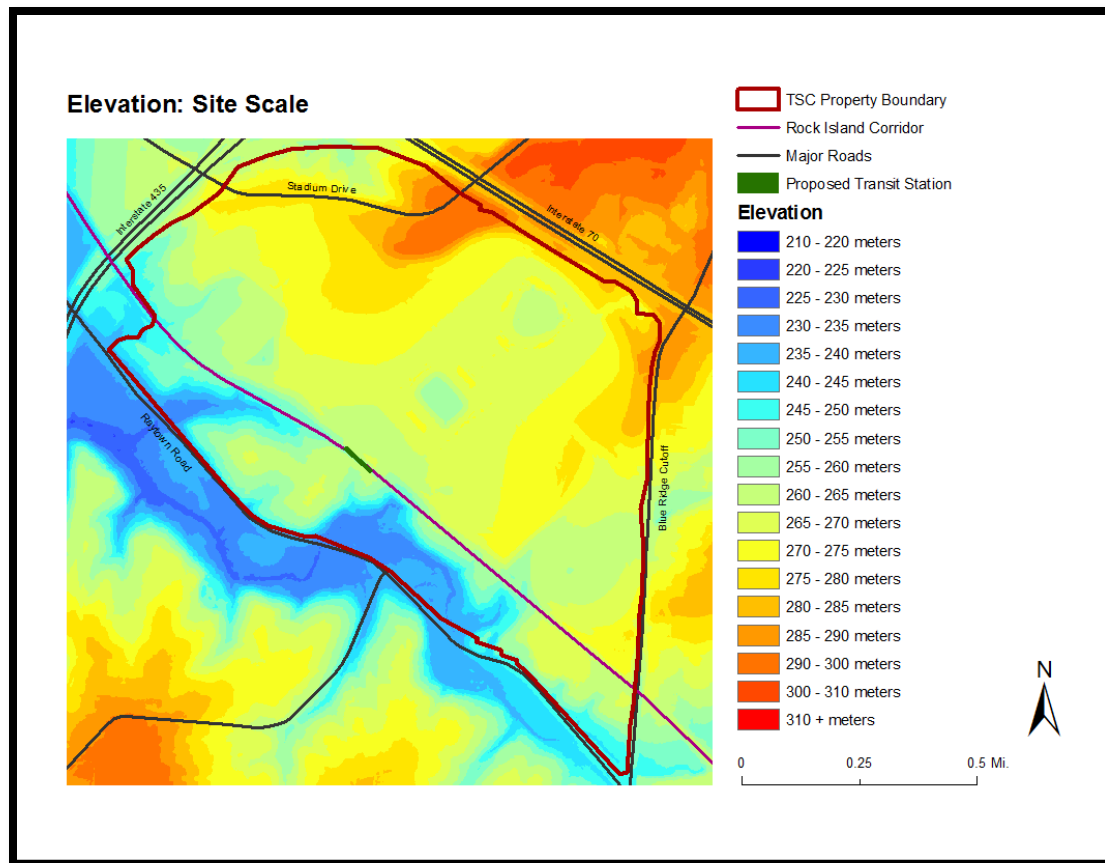


Figure 3.5. *Elevation: site scale.*

Elevation: Area Immediately South and West of Transit Station

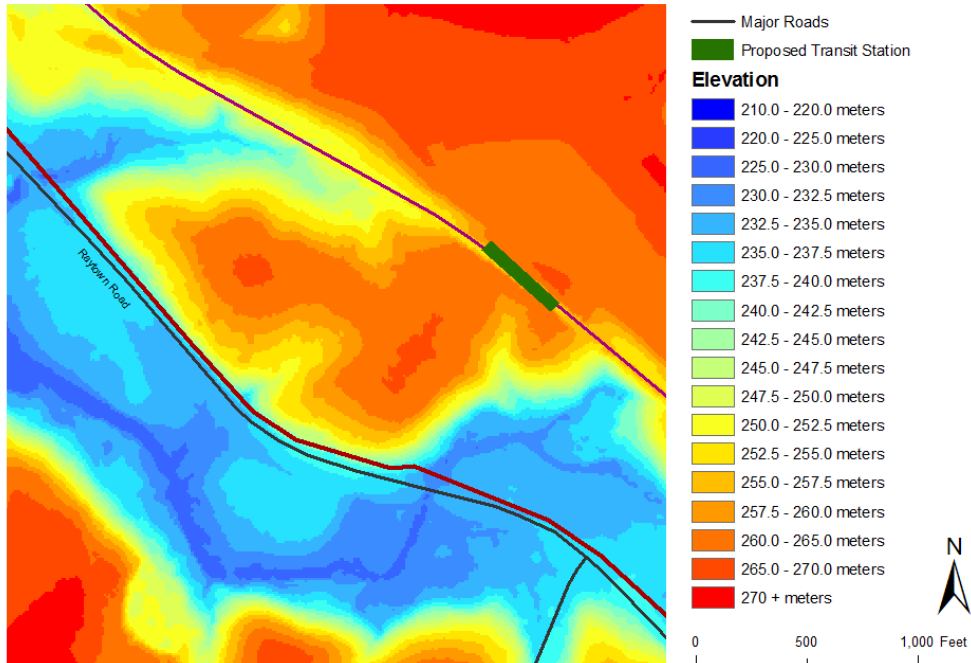


Figure 3.6. Elevation: area immediately south and west of transit station.

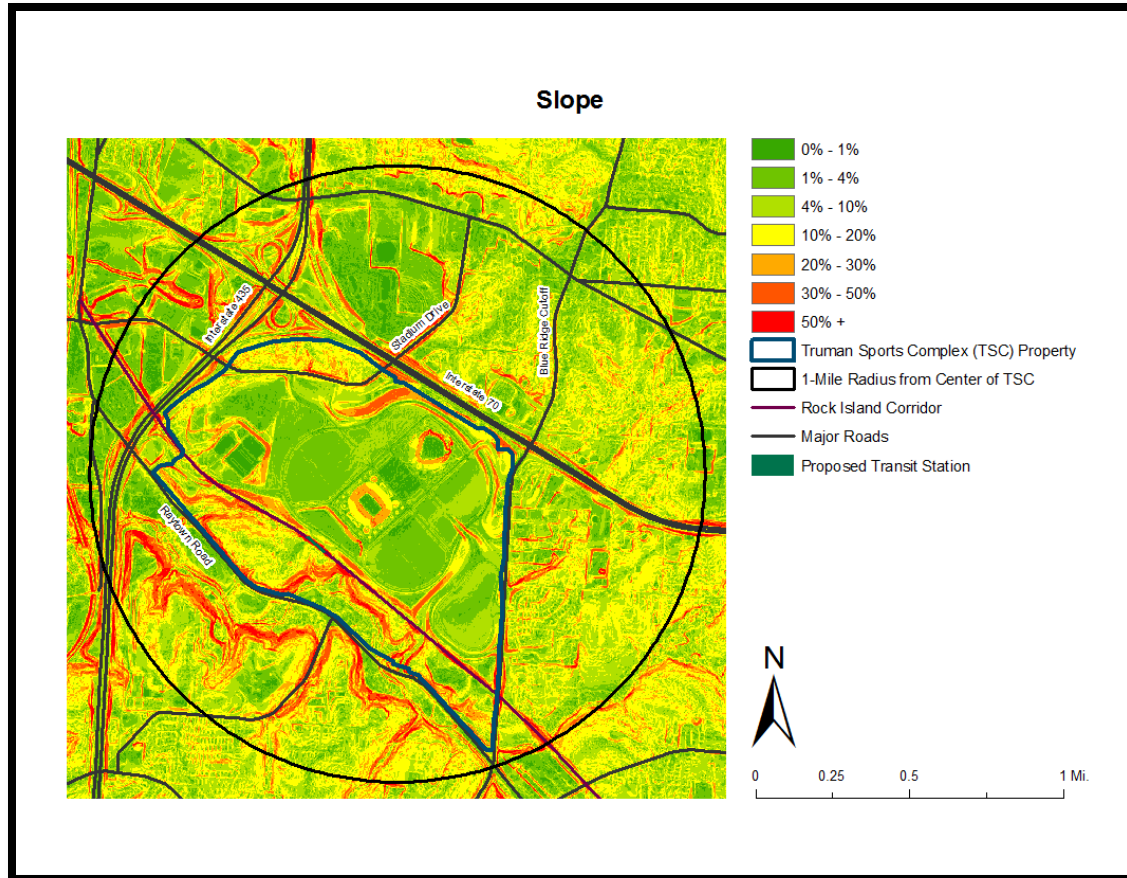


Figure 3.7. Slope.

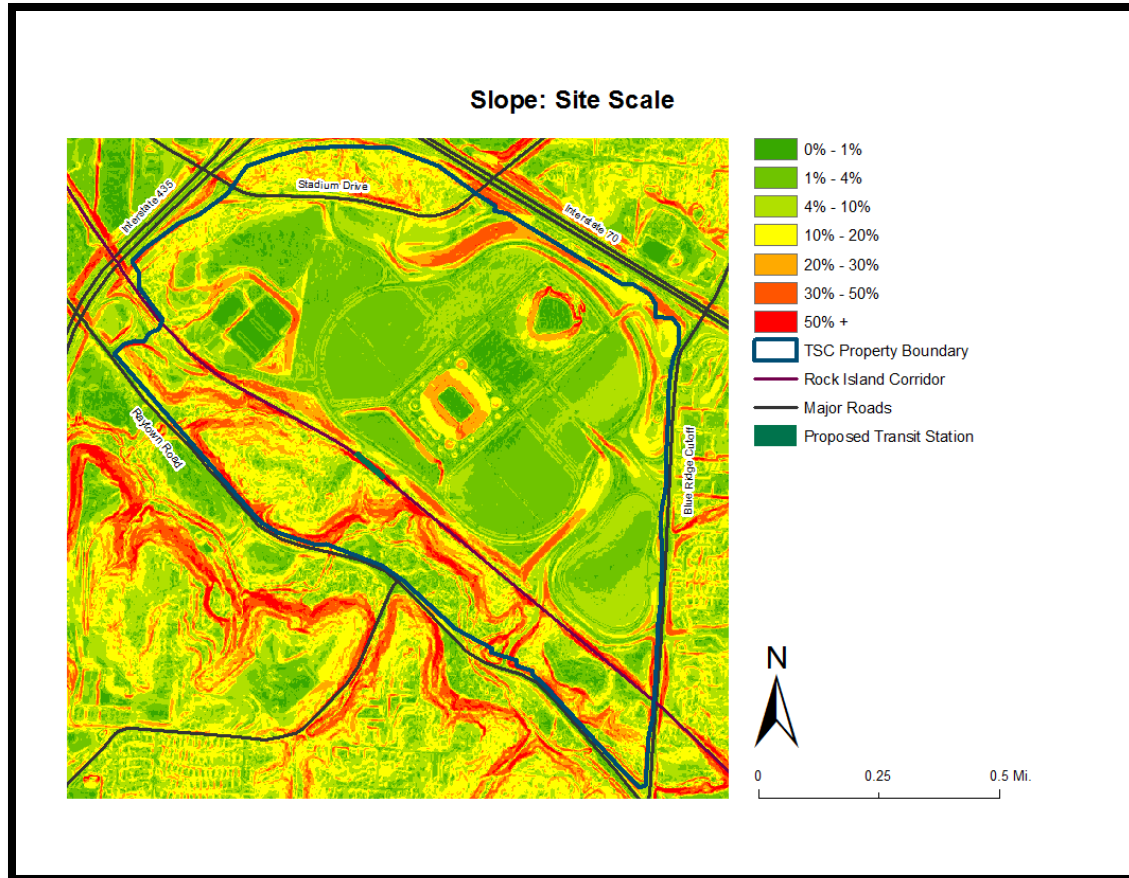


Figure 3.8. *Slope: site scale.*

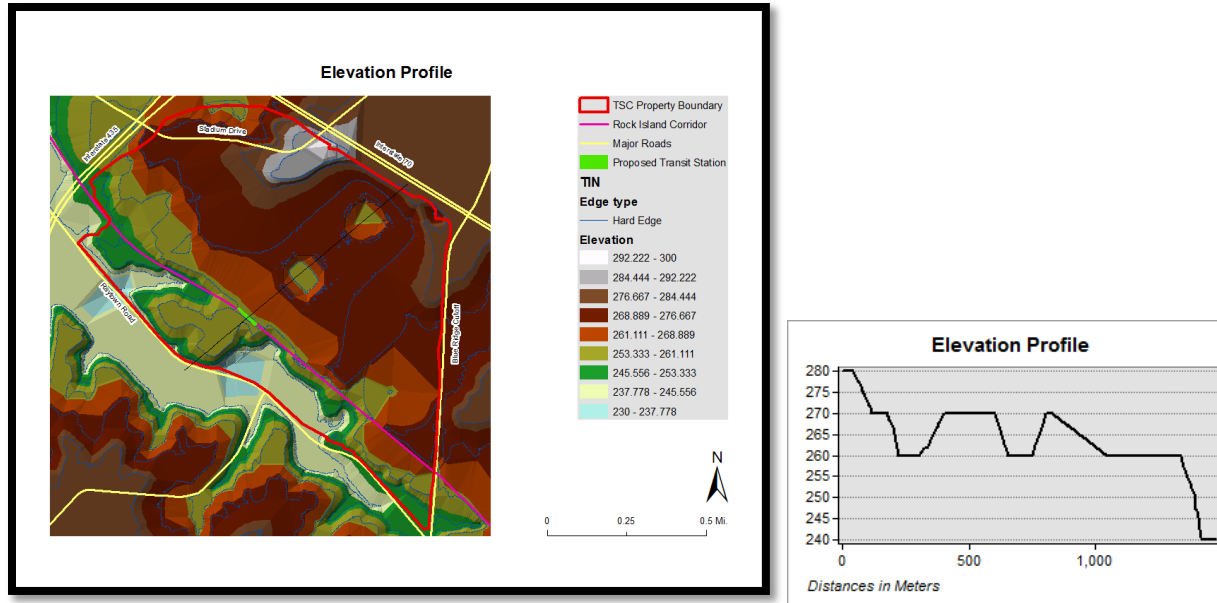


Figure 3.9. *Primary elevation profile.* (The black line in the map at left indicates the length of ground whose surface profile is shown in the graph at right, in exaggerated scale.)

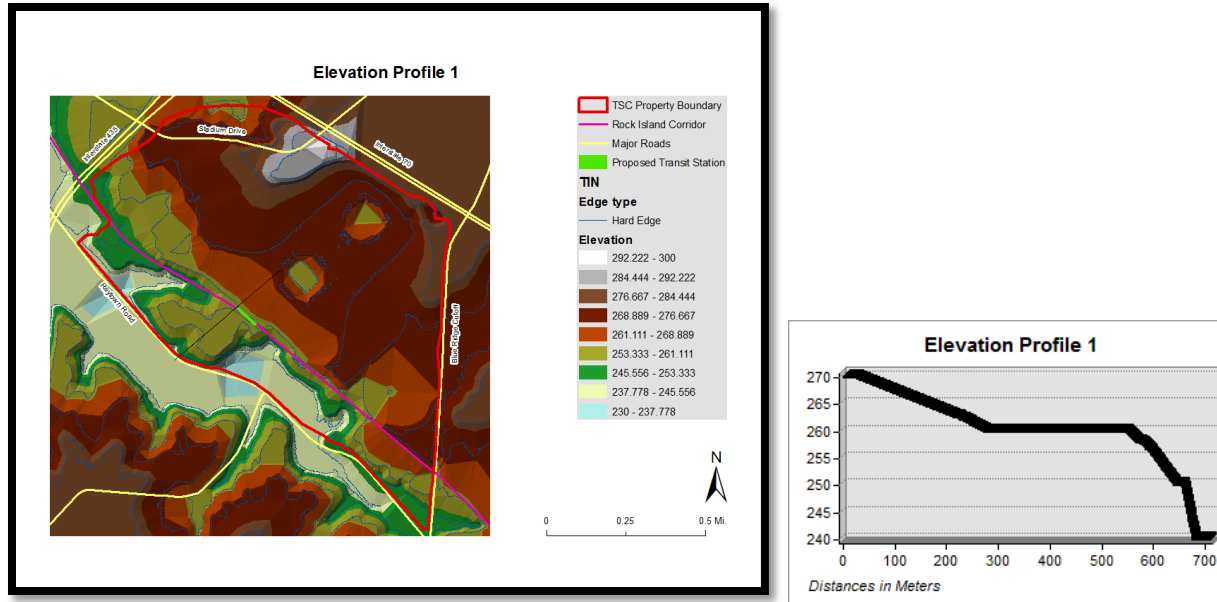


Figure 3.10. *Elevation profile west of stadiums.* (This and the following elevation profile illustrate the extremely rugged nature of the terrain in the area between Raytown Road and Arrowhead Stadium.)

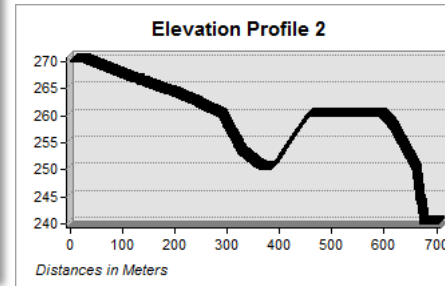
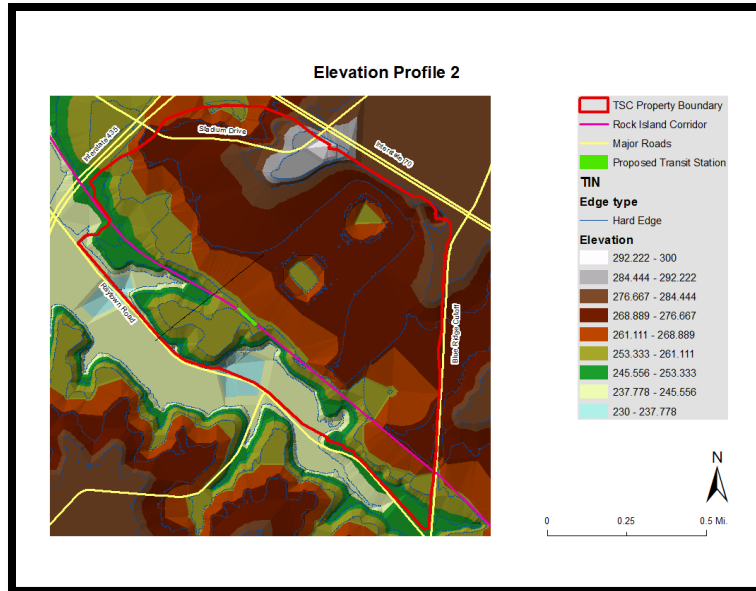


Figure 3.11. *Elevation profile farther west of stadiums.*

Soils, Land Cover, and Hydrology

Data of the site's soils and land cover reveal greater detail about the characteristics we have come to expect through site visits and earlier analysis. The soil classification for the entire parking area is “urban land, upland,” while the western side of the site consists of “urban land complex.” The undeveloped portion of the site between the parking lots and Raytown Road, however, consists of five soil categories: urban land complex, severely eroded clay loam, eroded silt loam, rock outcrop complex, and occasionally flooded silt loam. Only the western part of the undeveloped portion contains the “urban land complex” soil category. Eroded silt loam is the soil type that surrounds the proposed rail transit station (USDA 2009). Please see Figure 3.12 for a visualization of the site's soils.

While the developed portion of the site consists almost entirely of grass and paved parking surface, the southern, undeveloped portion contains a variety of

ground vegetation. Four land cover categories predominate that area: deciduous forest, deciduous woodland and immature forest, mixed evergreen deciduous, and lowland hardwood forest and woodland (MARC 2011b). Although some types of vegetation may be more valuable to the site's long-term uses than others, the presence of the heavily wooded area creates a natural feature that can be both preserved and enhanced as a site amenity. Please see Figure 3.13 for a map of the site's land cover, and please refer to the photographs of the proposed trail, mapped in Figure 3.3, for an additional visualization of the site's vegetation.

The water features of the site do not present extreme complications but do raise issues of notable importance. Round Grove Creek, a small stream, cuts through the south-central and southeastern portions of the site, all within the site's undeveloped portion. A floodplain surrounds most of Round Grove Creek on both of its sides, and thus the floodplain cuts into a significant portion of the site's undeveloped area,

including the area almost immediately southeast of the proposed transit station. This puts a severe constraint on the choices of building locations within the site. However, none of the parking surfaces, or even the grassy spaces between them, lie within a floodplain. While more than half of the undeveloped portion of the site remains outside of the floodplain, the challenges of topography still remain (MARC 2011b). Please see Figure 3.2 for the locations of Round Grove Creek and the floodplain.

Finally, three of the soil categories within the site's boundaries contain a high water table, with an upper depth ranging from two to five feet, and a lower depth ranging from 3.3 feet to greater than six feet. These soils exist in the southern and western portions of the site, mostly within the undeveloped areas, and the only area they leave open for buildings with foundations is the natural area containing existing trails. However, the training facility exists over one of these soil categories: Snead-urban land complex (USDA 2009). Please see Figure 3.14. In addition two of the soil

categories that may interfere with development have a relatively shallow depth to bedrock, which would increase costs if foundations or tunneling were necessary in those locations. The snead-urban land soil complex on the western portion of the site has a 39- to 50-foot depth to bedrock, and the snead-rock outcrop complex on the southern portion of the site has a zero- to 40-foot depth to bedrock (USDA 2009). Please see Figure 3.15.

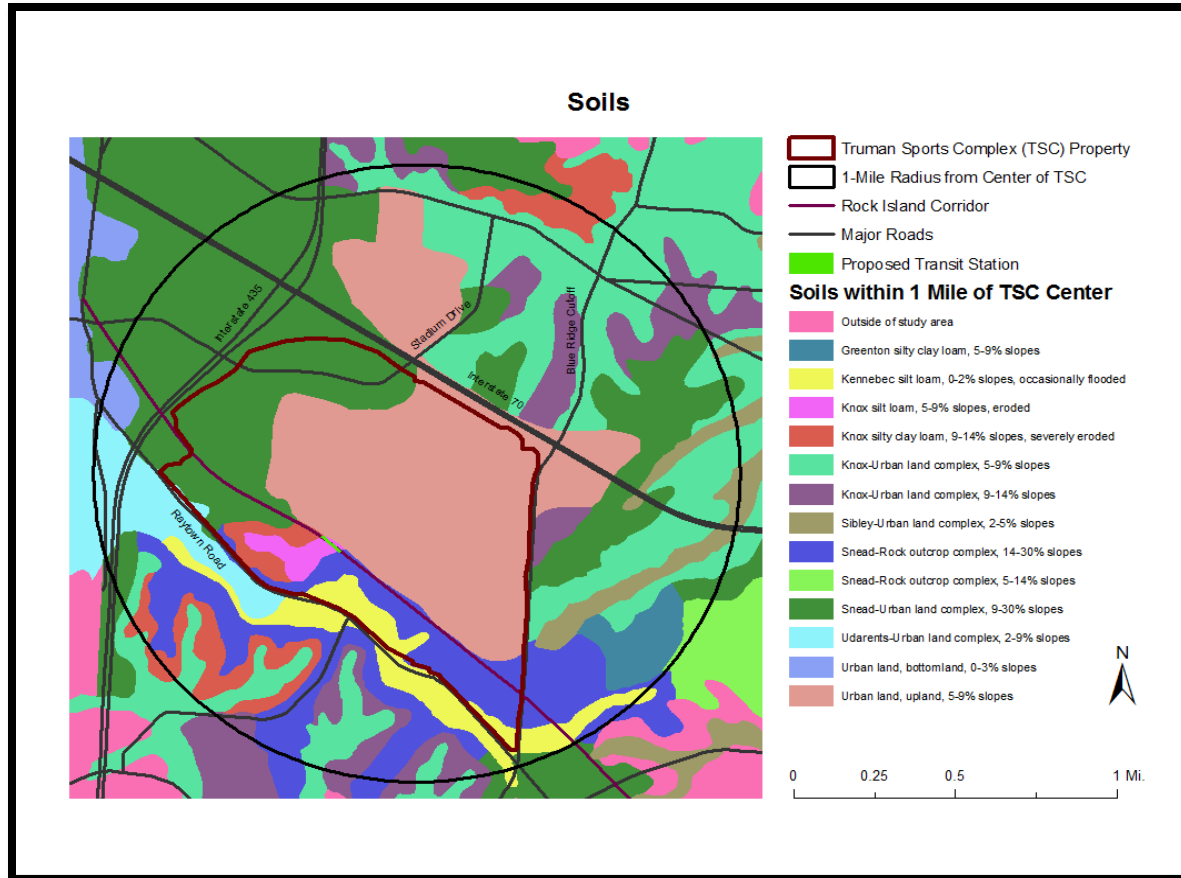


Figure 3.12. Soils.

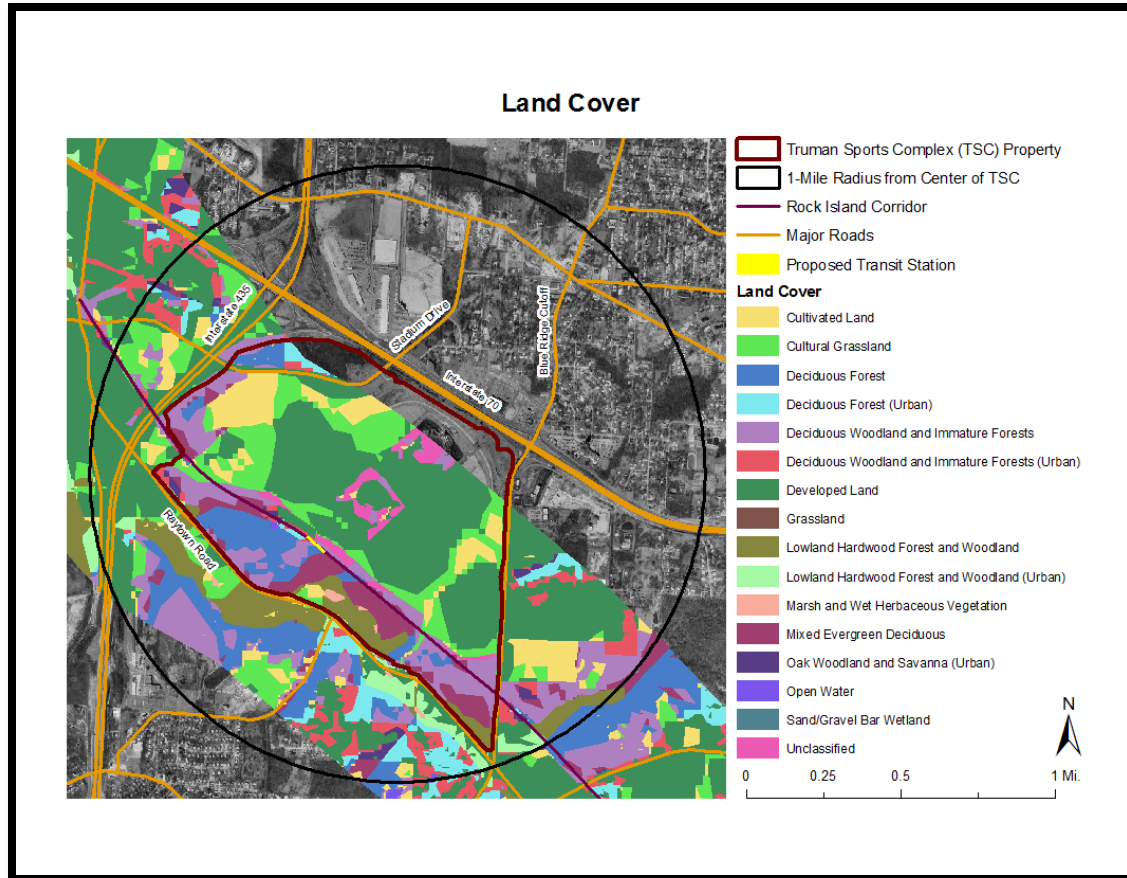


Figure 3.13. Land cover.

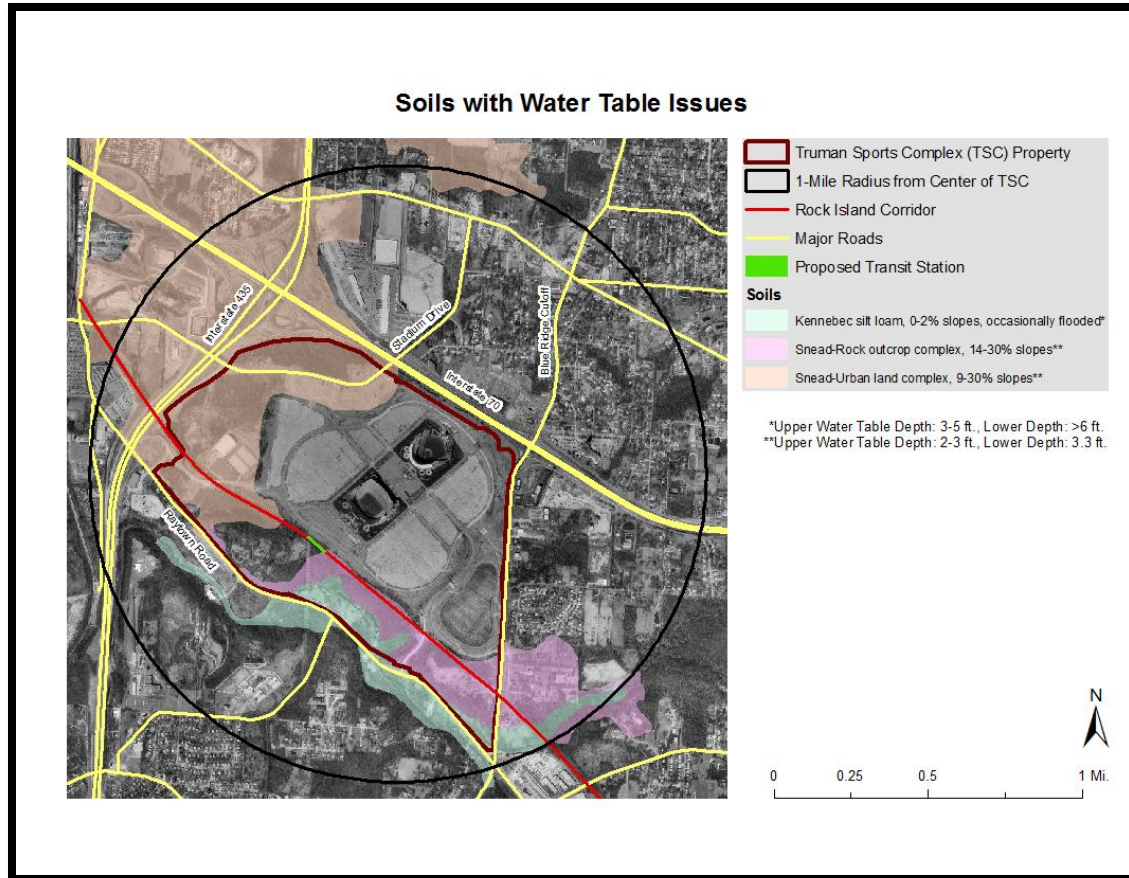


Figure 3.14. *Soils with water table issues.*

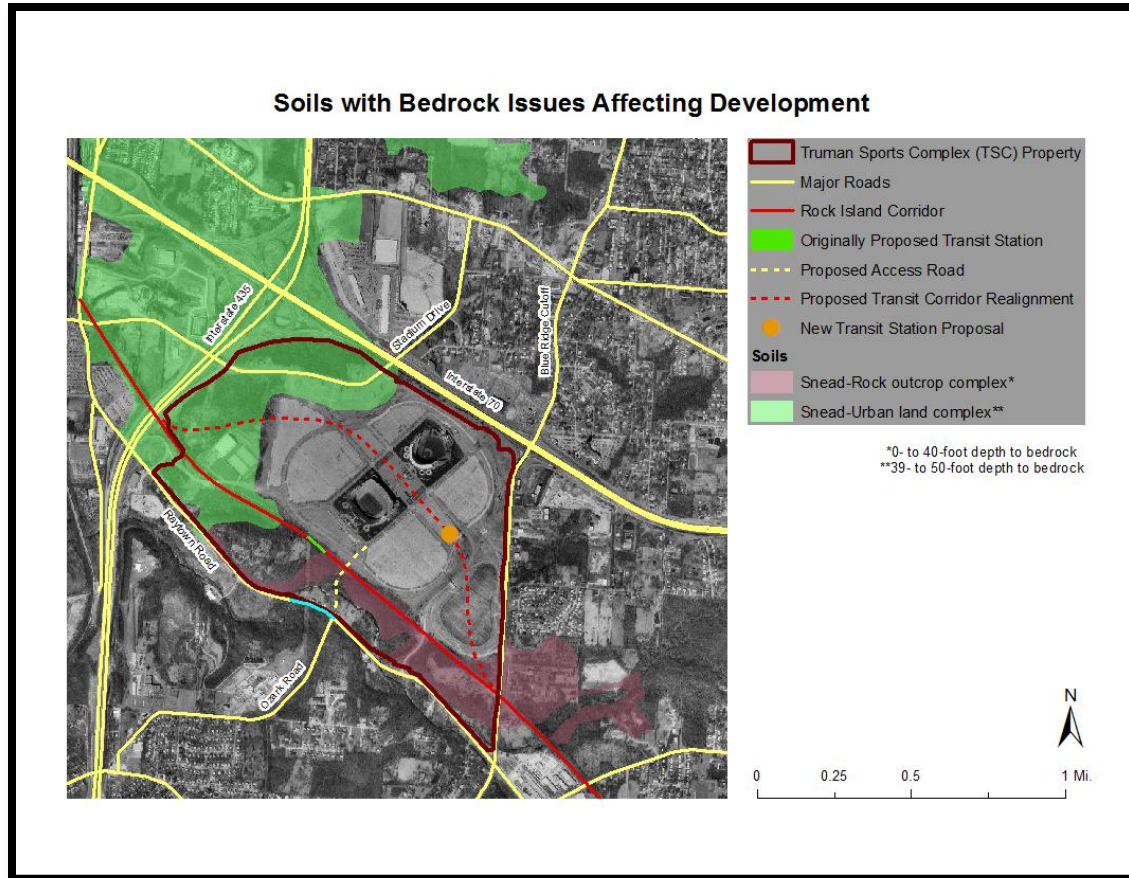


Figure 3.15. *Soils with bedrock issues affecting development.*

Transportation

In terms of automobile access, the Truman Sports Complex has the benefit of a location at the interchange of two Interstate highways: 70 and 435. The full diamond interchange between Interstate 70 and Blue Ridge Cutoff carries traffic from both directions of Interstate 70 to the sports complex. Travelers on northbound Interstate 435 have two additional exits from which they can access the sports complex: Raytown Road and Stadium Drive, both of which have a half-interchange with the freeway, only providing northbound off-ramps and southbound on-ramps. In addition, a recently constructed ramp from southbound I-435 to U.S. Highway 40 provides access to Stadium Drive from approximately three-quarters of a mile away, meaning travelers can exit the freeway, take U.S. 40 east, and access the sports complex from Stadium Drive.

The road network that serves the Truman Sports Complex is a hierarchy consisting of four main levels.

Freeways, Interstates 70 and 435, represent the highest level of the hierarchy. Arterial roads are the next-highest level, which consists of Blue Ridge Cutoff, U.S. Highway 40, and Raytown Road. The next level down is collector streets, and those include Stadium Drive, 43rd Street, and Ozark Road. The lowest level is local streets, which consist of all public roads below the level of collector streets, as well as the internal circulation system of the sports complex site. Please see Figure 3.16 for a map depicting this road network and its hierarchy.

Blue Ridge Cutoff, a seven-lane, undivided arterial road, has four access points to the sports complex. Raytown Road and Stadium Drive, both of which are less wide, each have two access points. None of the access points to the sports complex are controlled by a traffic signal. This is likely due to the fact that traffic entering and exiting the sports complex is only significant on the days of professional sporting events, which are a small minority of the total days in a year. However, intense commercial, office, and residential

development on the site would bring year-round traffic, which may necessitate a signalized intersection on Blue Ridge Cutoff, an additional connection to Raytown Road, or both. A signalized intersection on Blue Ridge Cutoff would also facilitate better pedestrian access across the arterial, which already has commercial and residential development on its eastern side.

Traffic accessing the site via Raytown Road must use Blue Ridge Cutoff in order to access Interstate 70 and northbound Interstate 435. Additional traffic could be accommodated on the western portion of the site if Raytown Road or Stadium Drive had an on-ramp to northbound I-435. However, this would require a substantial construction cost, since the new ramp would necessitate an overpass to avoid a conflict with the ramp from northbound I-435 to eastbound I-70. Please see Figure 3.17 for a map showing the proposed ramp.

Traffic volumes are another informative site consideration, although one should expect them to

increase on certain roads after development of the TOD. One of the most noteworthy characteristics is the differences in traffic volumes between Blue Ridge Cutoff, Raytown Road, and Stadium Drive. Within a mile of the site's center, Blue Ridge Cutoff has traffic volumes of between 5,000 and 10,000 vehicles per day, with a small segment north of I-70 even exceeding 10,000. Raytown Road and Stadium Drive, however, both have traffic volumes of less than 5,000 vehicles per day, except for the segment of Raytown Road immediately east of Blue Ridge Cutoff, which is in the 5,000 to 10,000 range. This relationship is projected to remain the same through 2040 (MARC 2011b). Please see Figures 3.18 and 3.19 for maps showing traffic volumes.

The Rock Island Corridor, planned as a rail transit line connecting downtown Kansas City to Lee's Summit and possibly beyond, will bring a transit station to the sports complex, proposed to be located southwest of Arrowhead Stadium, facing the stadium. The transit station is planned as an intermodal hub

with a large park-and-ride facility, and thus, it will include a large transfer center, sheltered platforms, ticket vending, convenience amenities, and more than 50 parking spaces. In addition, the route of the I-70 Commuter Corridor for rail transit is still uncertain, and one option is to merge it with the Rock Island Corridor just east of the sports complex (MARC 2012). The Truman Sports Complex station will serve commuters from the immediate area, commuters driving from surrounding areas, commuters transferring between transit modes, and sporting event attendees from all over the Kansas City region. Furthermore, the possible convergence of two rail lines at the sports complex would provide even greater transit access to the site, and it would provide the development greater visibility to commuters.

Bus transit, provided by the Kansas City Area Transportation Authority (KCATA) already serves the Truman Sports Complex. The Blue Ridge Express bus route serves the site via Blue Ridge Cutoff, and two separate stops are located at two of the site's entrances

(MARC 2011b). When the Rock Island Corridor becomes a major transit route, this and perhaps additional bus lines will feed into the Rock Island line at the Truman Sports Complex station, providing increased intermodal service. Please see Figure 3.20 for a map of transportation features surrounding the sports complex site.

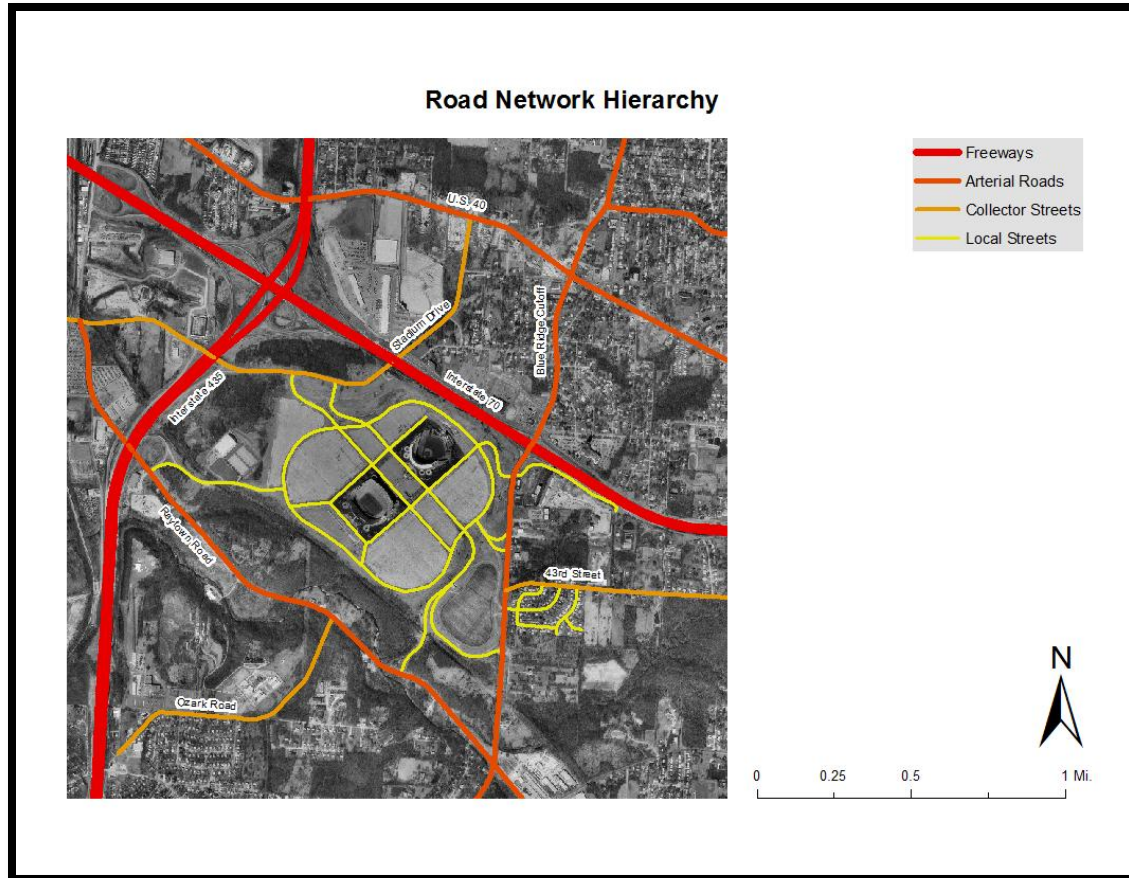


Figure 3.16. Road network hierarchy.

Proposed Road Improvement

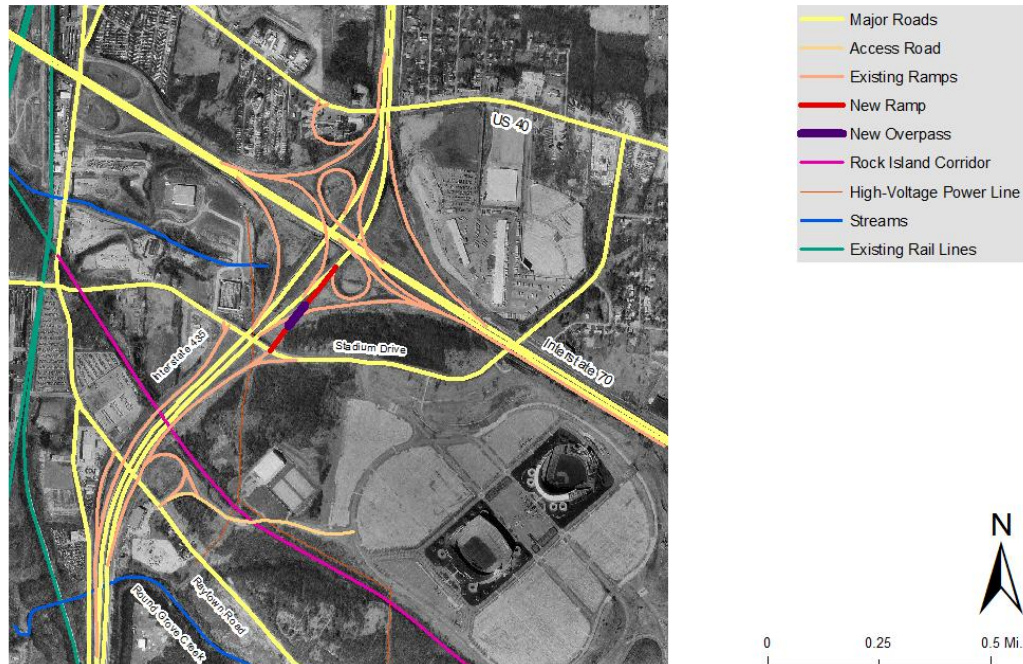


Figure 3.17. Proposed road improvement.

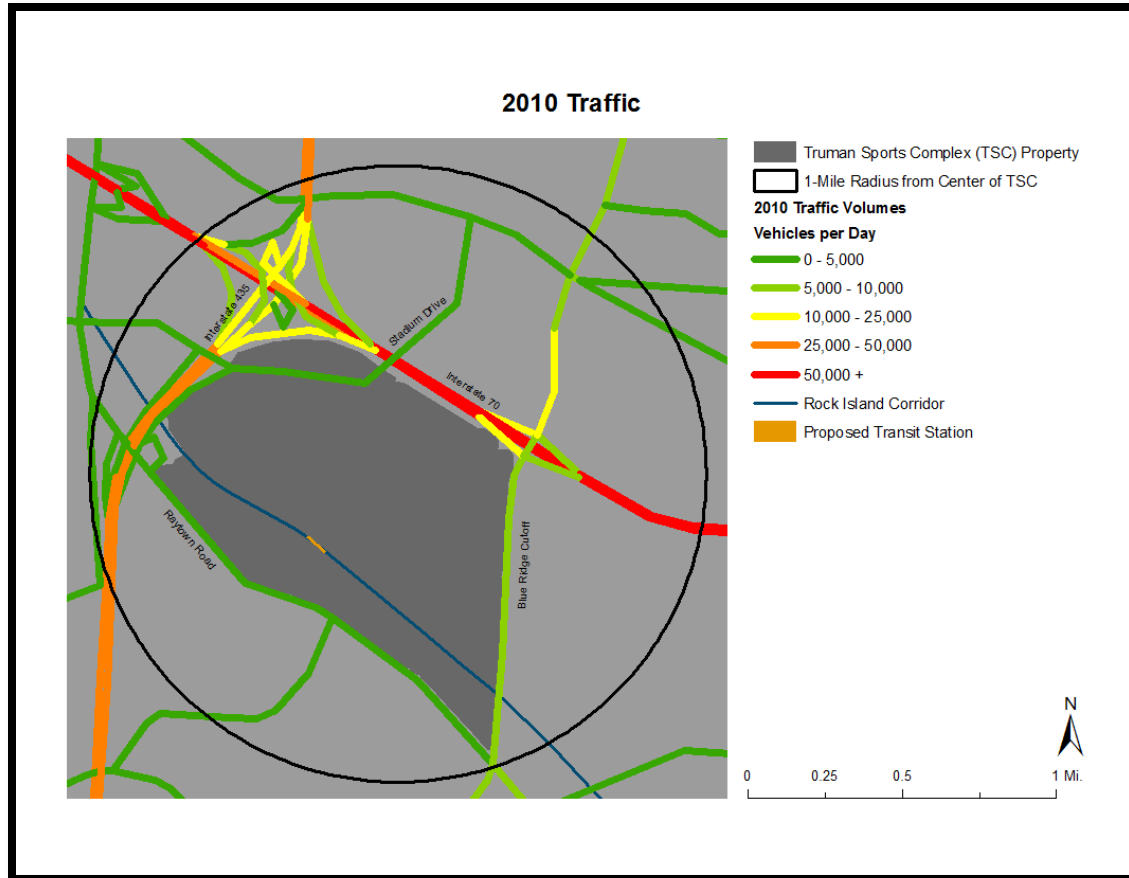


Figure 3.18. *2010 Traffic.*

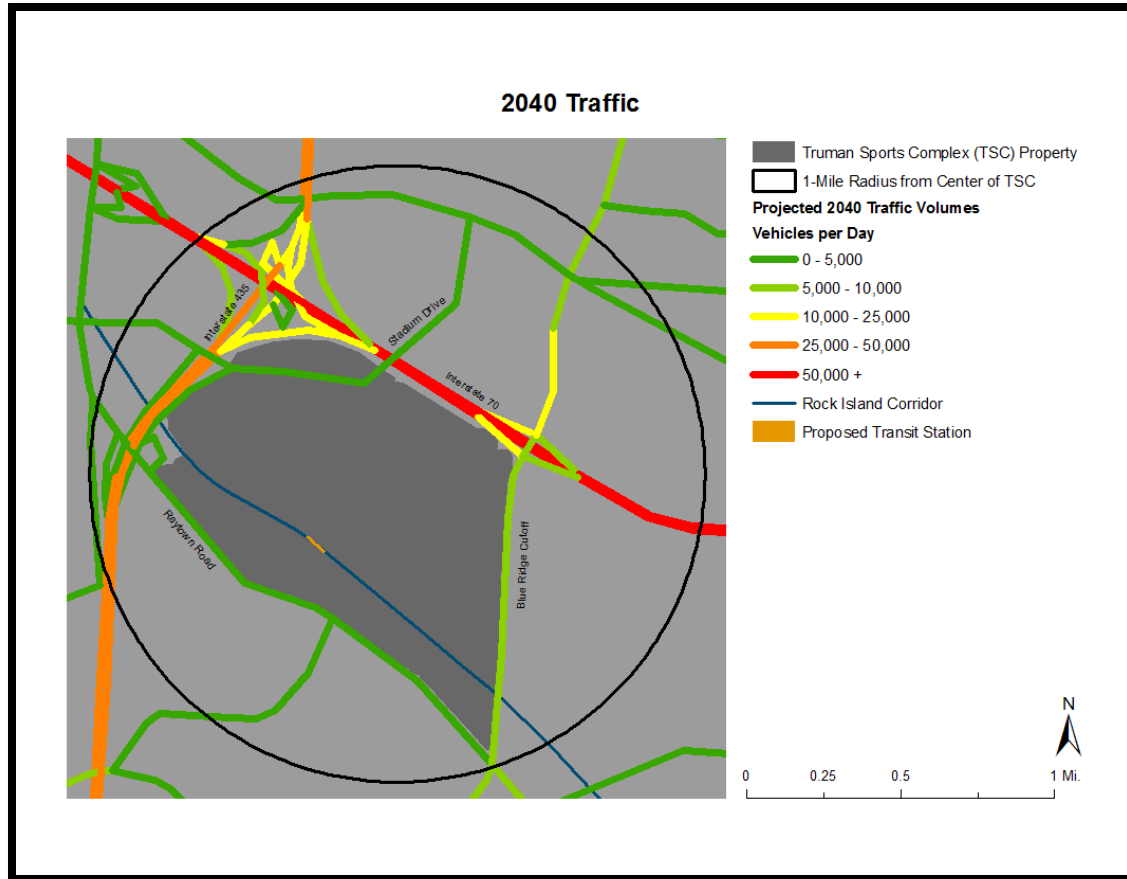


Figure 3.19. *2040 Traffic.*

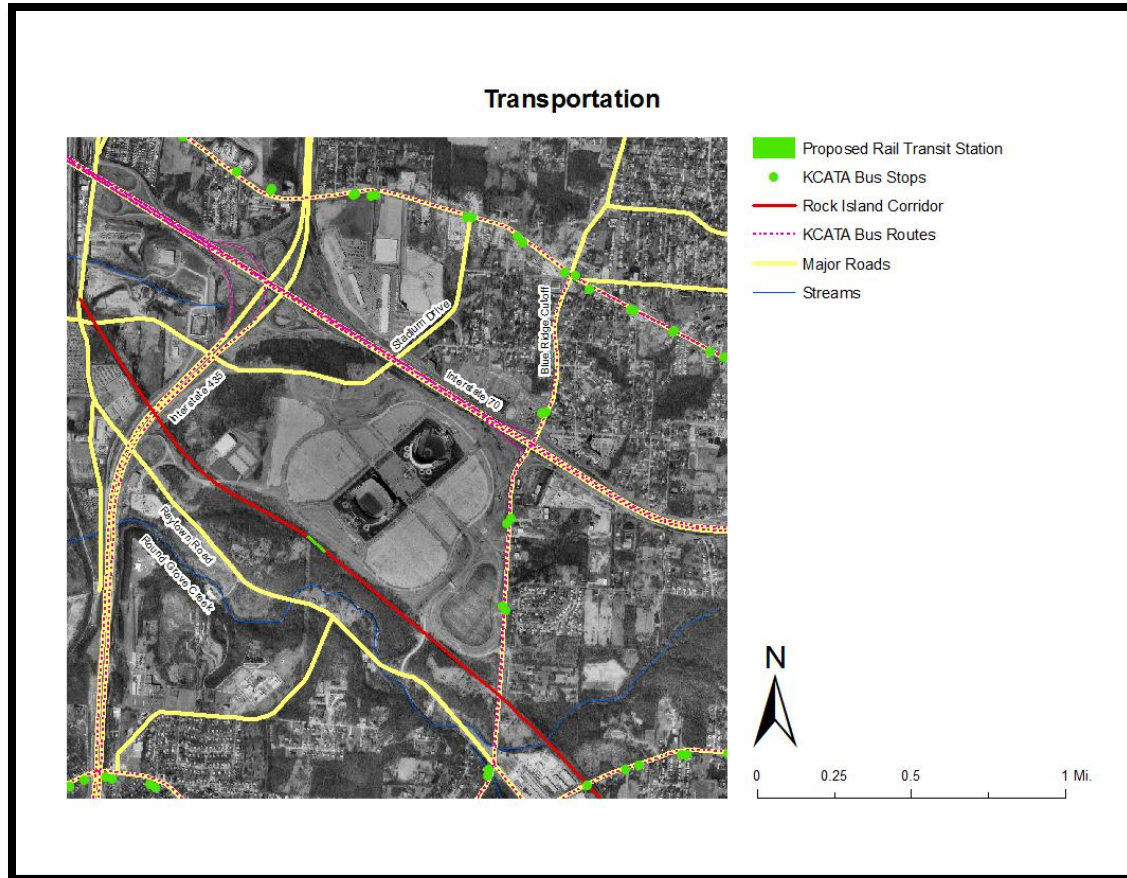


Figure 3.20. *Transportation.*

Surrounding Land Use and Housing

A variety of land uses, including several types of commercial, offices, industrial, institutional, public uses, parks and recreational space, and single- and multi-family residences, exist within a mile of the site's center. However, the majority of that land—60 percent—is single-family residential (MARC 2011b). Furthermore, the average residential density within a mile of the center of the sports complex is 0.32 dwelling units per acre (U.S. Census Bureau 2010). Please see Figures 3.22 and 3.23 for maps of the surrounding land uses and residential density. Most of the residential buildings within a mile of the site's center are several decades old. 34 percent were built in the 1960s, 30 percent are from the 1950s, and 21 percent are from the 1940s (MARC 2011b). The ages of the surrounding buildings will affect the relationship between new construction on the sports complex site and the surrounding context. Please see Figures 3.21 and 3.24 for visualizations representing the various ages of surrounding residential buildings.

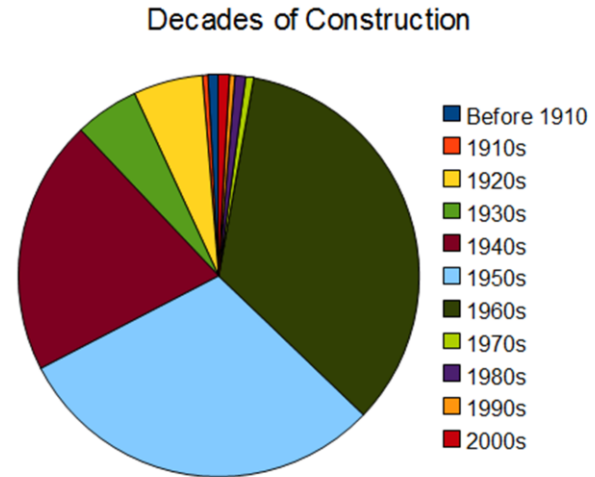


Figure 3.21. *Housing within one mile of the Truman Sports Complex.*

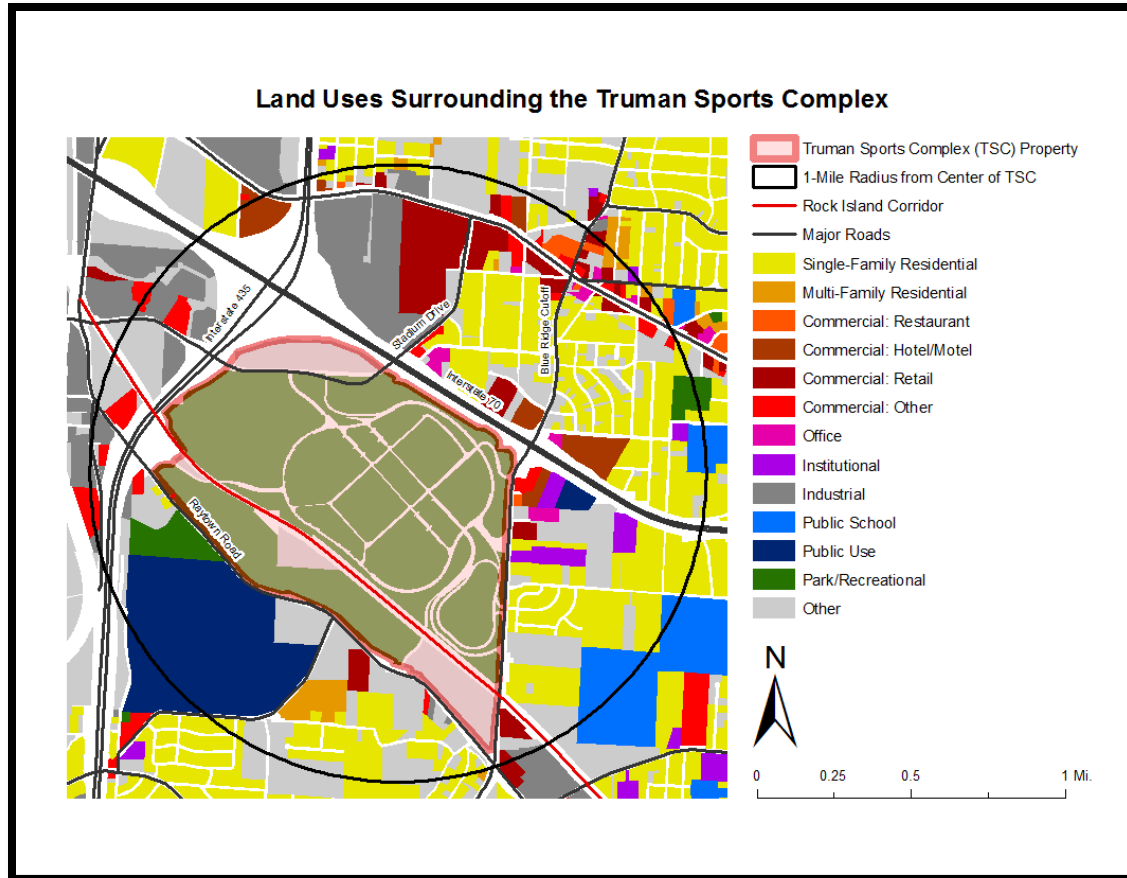


Figure 3.22. Land uses surrounding the Truman Sports Complex.

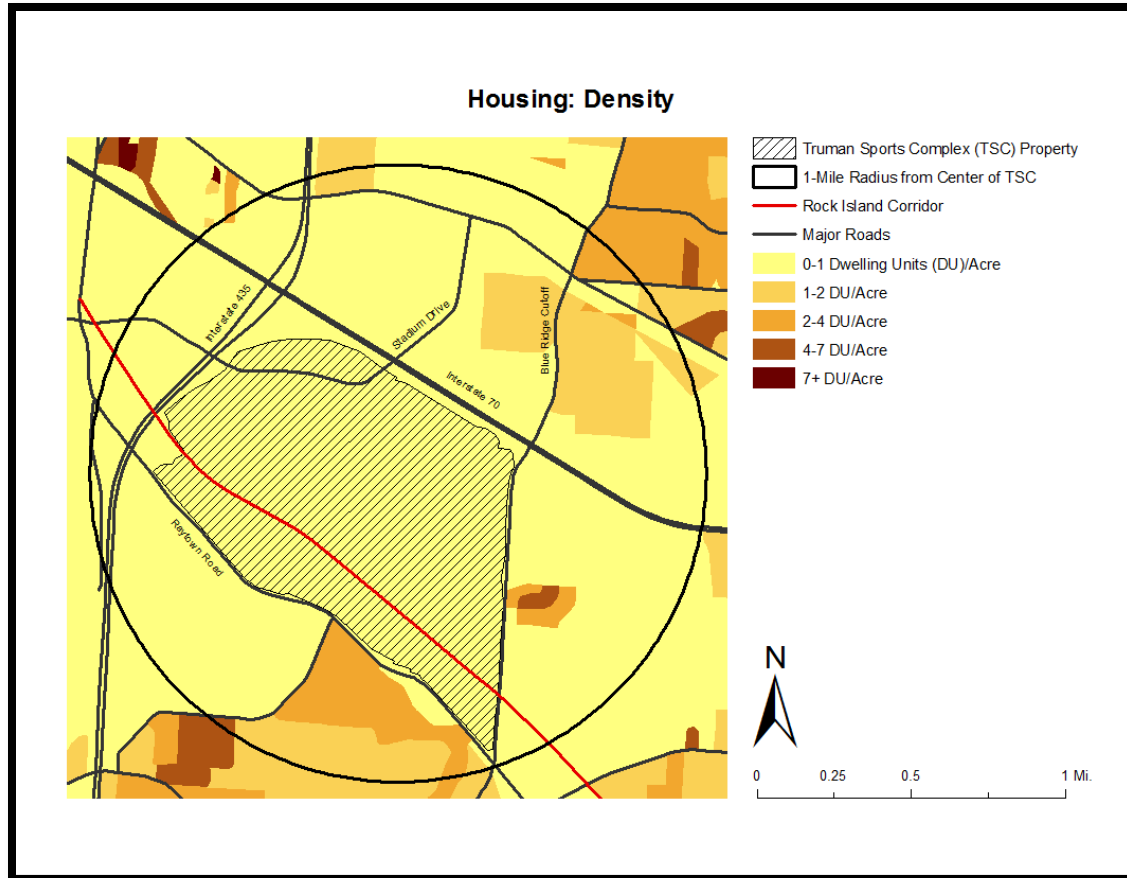


Figure 3.23. *Housing: density.*

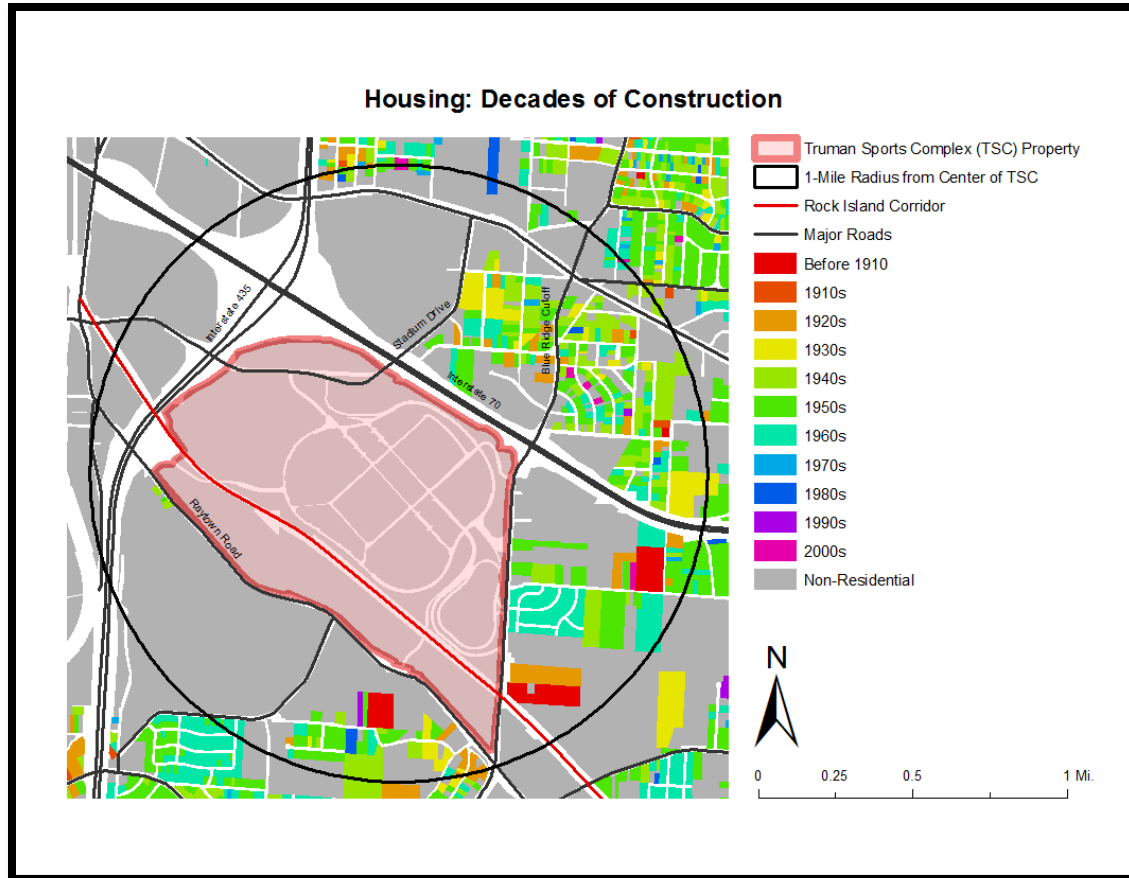


Figure 3.24. *Housing: decades of construction.*

Regulations and Existing Plans

Due to the Truman Sports Complex's location within the Kansas City region, many different actors affect the plans and regulations pertaining to the site. The City of Kansas City, Missouri has jurisdiction for land use regulations affecting the site. The Mid-America Regional Council's transportation planning efforts influence transportation interventions that affect the site, while the Kansas City Area Transportation Authority currently runs all of the public transit that serves the site. In addition the Missouri Department of Transportation owns and maintains the portions of Interstates 70 and 435, as well as their interchanges, which accommodate much of the transportation that occurs to and from the site.

The Jackson County Sports Complex Authority (JCSCA) owns all of the Truman Sports Complex property, and it serves as a regulatory body that governs the site. JCSCA is in a unique position because of its ownership of the two cultural icons that are the

sports stadiums. Because of this high visibility and relative significance in the Kansas City region, JCSCA is more likely to have success in making radical land use changes than are most other property owners. In fact, the current zoning for the sports complex property does not even reflect its use for the two stadiums. Rather, it seems to be a remnant of previous zoning that was never changed (Gerald F. Williams, email message to author, Dec. 12, 2011; City of Kansas City 2011). Please see Figure 3.25 for a map showing the site's current zoning.

Another important issue is school districts. The question of which school district serves the development site relates to the desirability of residential location decisions. In effect, dwelling units will be more desirable to prospective buyers and tenants if they lie within the school district with the best reputation. Most of the site is in the Kansas City, Missouri School District; however, the southeastern portion sits within the Raytown School District. The boundary line cuts through the site in a manner that

bears no relation to desirable building patterns. If residential development crosses the boundary line, then the school districts will need to redraw the line in order to serve potential students efficiently. That is to say, all of the site's residences should be in the same school district. Please see Figure 3.26 for a map of the school district boundaries that run through or near the site.

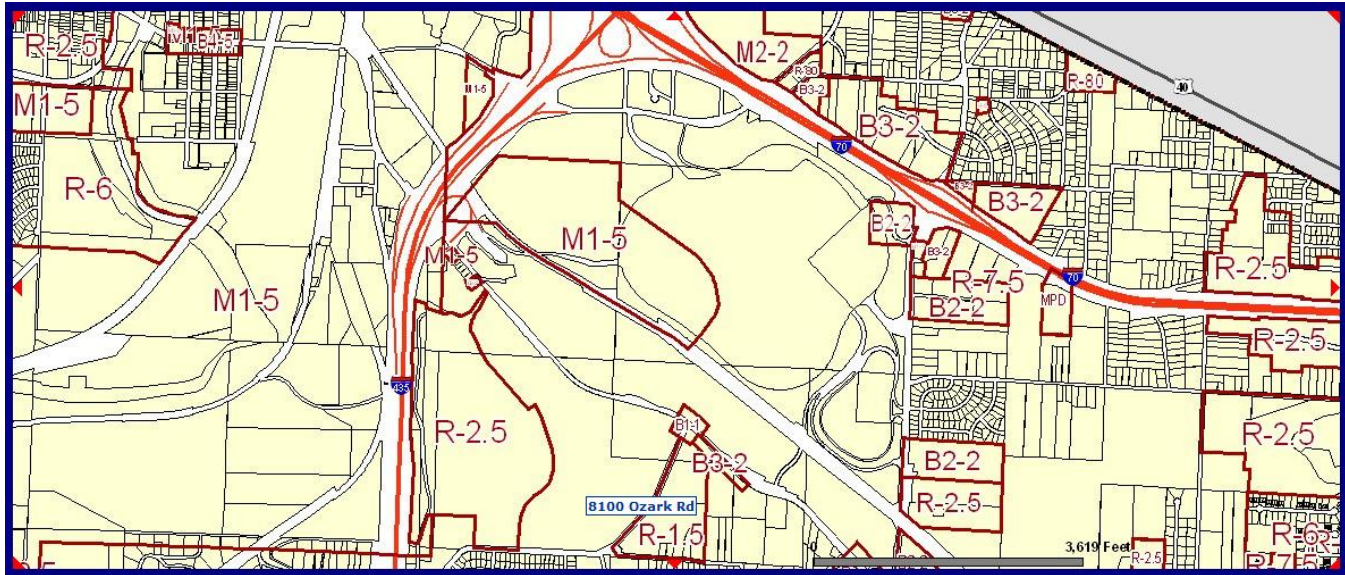


Figure 3.25. Zoning of Truman Sports Complex site.

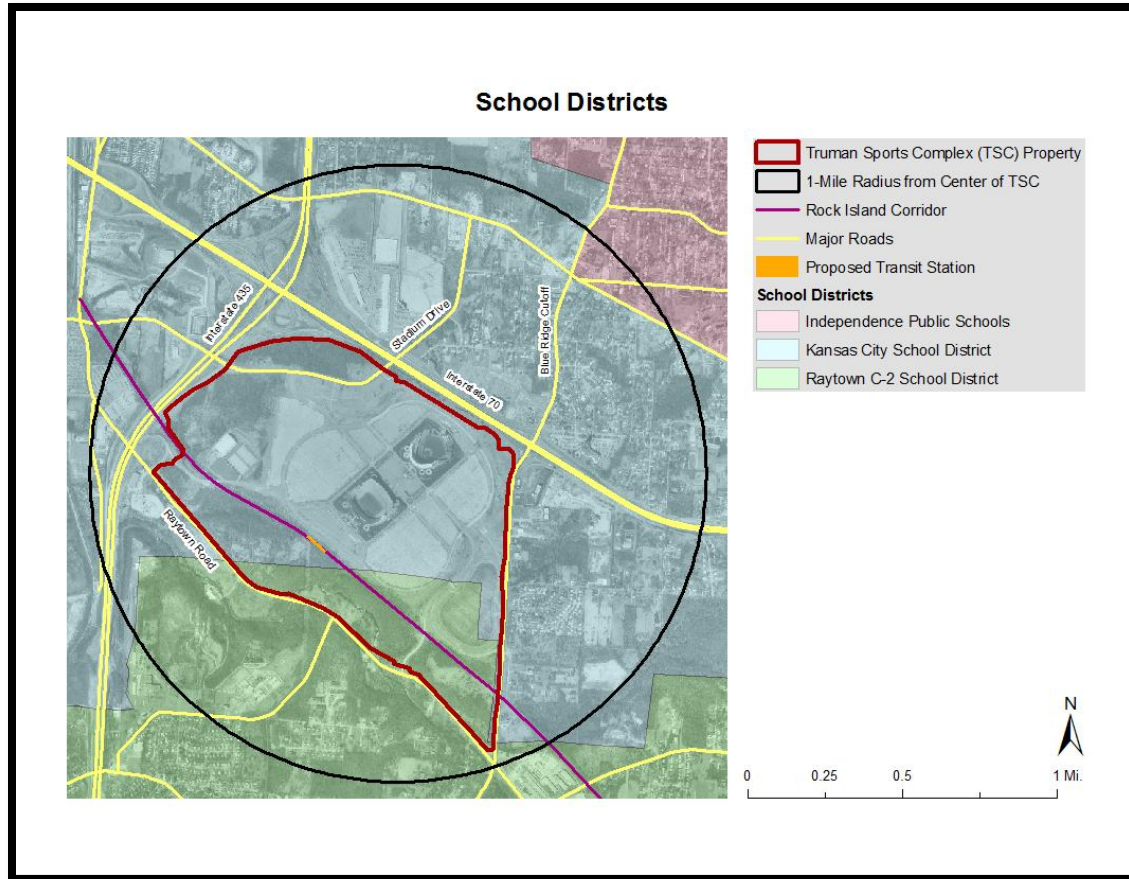


Figure 3.26. School districts.

Conclusions

The main lesson of this site analysis is that, while many different portions of the Truman Sports Complex site offer unique potential for locating the transit-oriented development, relative advantages and disadvantages prevail throughout the site. The undeveloped area between the southern edge of the parking lots and Raytown Road offers the advantages of increasing automobile access to and visibility from Raytown Road as well as minimizing the need to build parking garages on the sports complex site, but it has the disadvantages of the need for site grading, as well as the loss of a potential natural amenity—the wooded area for walking and bicycling trails. One of the unique aspects of this site is the contrast between the flat, paved, urbanized visual character of the stadiums and the parking lot, and the steep, wooded, naturalistic and semi-rural quality of the area along Raytown Road.

Meanwhile, the parking lots immediately to the south and east of Arrowhead Stadium offer the advantages of pedestrian access to both the transit station and the stadiums as well as minimizing the need for site grading, but that area brings the

disadvantage of the need to consolidate parking into large garages, as well as the lack of visibility to drivers on Raytown Road. We developed these conclusions after both in-depth data analysis and extensive site visits. Please see Figure 3.27 for a series of site photographs, as well as Table 3.1 for a summary of these findings. Automobile access to and from Raytown Road, however, can be improved with a modification to the site's internal street system. Visibility can be improved with increased signage and site amenities. These ideas will be developed further in the following sections.

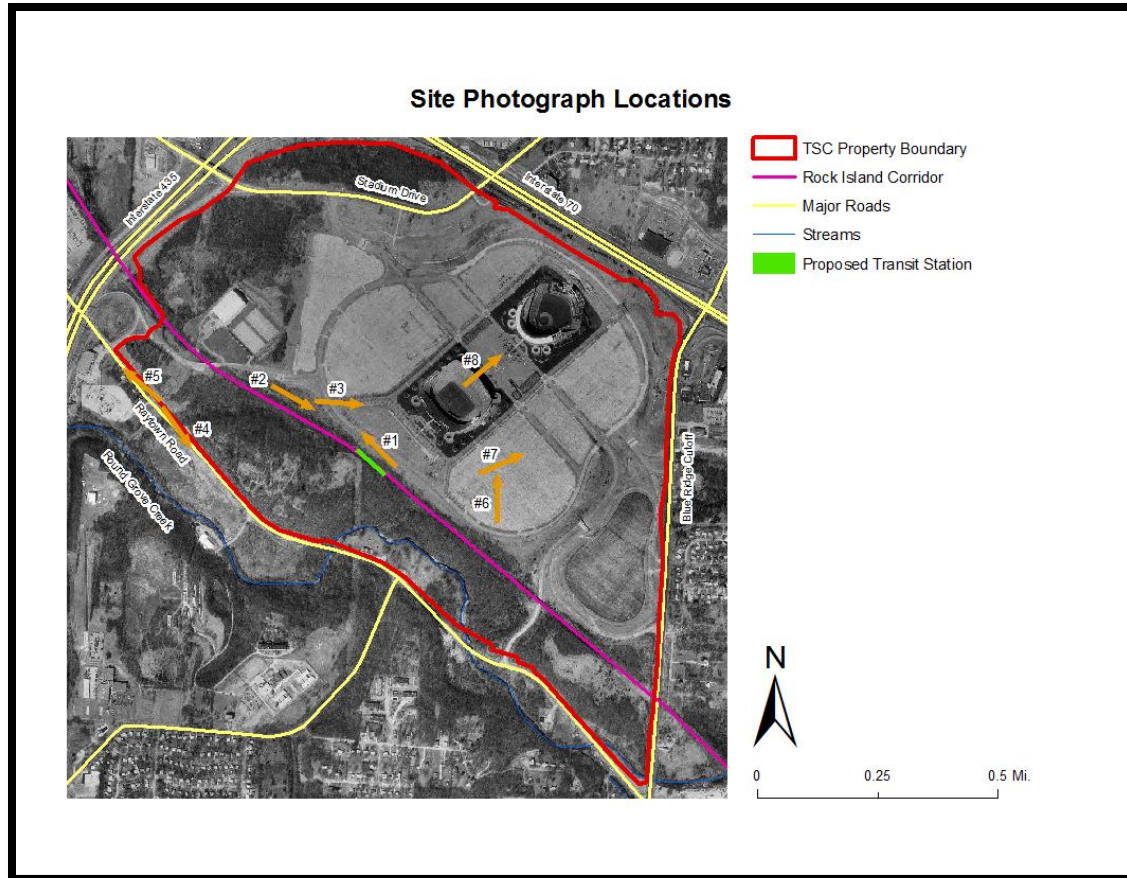


Figure 3.27. *Site photograph locations.*



Figure 3.27a. *View of natural area.* (Note the existing vegetation.)



Figure 3.27b. *View from natural area.* (Note the sloped terrain south of Arrowhead Stadium.)



Figure 3.27c. *View of Arrowhead Stadium from west.*
(Note the landscaped entrance, designed primarily as a visual element for automobile traffic.)



Figure 3.27d. *View of Raytown Road looking east.* (Note the wooded quality of the immediate area.)



Figure 3.27e. *View of Raytown Road looking west. (Note the low-density, semi-rural development characteristics adjacent to the Truman Sports Complex.)*



Figure 3.27f. *View of stadiums from south. (Note how the stadiums sit in the middle of a large parking surface.)*



Figure 3.27g. *View of parking lot looking northeast.*
 (Note the vastness of the eastern parking lot—the area on which we propose to develop Stadium City, as explained in the next chapter.)



Figure 3.27h. *View of Kauffman Stadium from Arrowhead Stadium.* (Note the current use of the space between the two stadiums—an area we propose to transform into a public plaza.)

Table 3.1. *Summary of site analysis.*

Characteristic Category	Main Findings
Total Acreage	594 acres
Existing Parking Spaces	19,200 paved and 6,800 unpaved
Conflicting Infrastructure	High-voltage power line in southwestern portion of site
Trails	Existing unpaved trail network and potential area for new trail
Elevation	Entire site: 220 to 330 meters Parking area: 250 to 270 meters 30-meter elevation change in undeveloped area between Raytown Road and parking lot
Slope	Greater than 10 percent in natural area, often approaching 50 percent
Soils	Eroded silt loam in undeveloped area along Rock Island Corridor
Land Cover	Deciduous forest, deciduous woodland and immature forest, mixed evergreen deciduous, and lowland hardwood forest and woodland in undeveloped area along Raytown Road

Characteristic Category	Main Findings
Hydrology	Round Grove Creek Floodplain along portion of Raytown Road High water table in southern and western portions of site
Automobile Transportation	Freeways: I-70, I-435; Arterial Roads: Blue Ridge Cutoff, U.S. 40, Raytown Road; Collector Streets: Stadium Drive, 43 rd Street, Ozark Road; Local Streets: other public streets, sports complex circulation system
Interchange	Proposed ramp from Stadium Drive to Northbound I-435
Traffic Volumes	Generally higher on Blue Ridge Cutoff than on Raytown Road or Stadium Drive
Rail Transit	Rock Island Corridor
Bus Transit	KCATA Blue Ridge Express route, two stops on site
Surrounding Land Use	60% single-family residential
Surrounding Housing	85% built between 1940 and 1969
Surrounding Density	0.32 DU/acre average
Schools	Part of site in Kansas City district, part in Raytown district
Regulations	Site owned by JCSCA, zoning unrelated

Development Program

Kevin conducted an extensive, broad market analysis exploring Stadium City's economic role in the Kansas City region, as well as detailed program that outlines the types of land and building uses that this development project incorporates. His work shows that the target market for this development is people between the ages of 21 and 49, mostly including young professionals, small-family households, and people who value higher-density urban amenities. The plan for this development is spread across six phases, stretching from 2017 to 2030. The program calls for a total of 1,884 dwelling units, including studio, one-, two-, and three-bedroom apartments in a variety of building types. It proposes 750,000 square feet of retail and entertainment, including a hotel, theater, grocery store, and more than 447,000 square feet of shops, restaurants, and bars. The program also includes over 1,500,000 square feet of office spaces, and it proposes various public uses, including the transit station, a

public plaza between the stadiums, a public park, and an extensive natural preserve with a trail system.

The research also shows that the planned transit route should increase nearby property values. Based on employment, housing, population, and income trends, the market analysis shows that the project is economically viable in the Kansas City region. Analysis of competing projects is needed to determine specific pricing and marketing strategies. The program also highlights the need to provide 15,352 parking spaces on the site, planned for multi-level garages, in order to accommodate the total development. Please see Kevin Credit's *Stadium City* document, or the jointly produced *Stadium City* document, for the full development program and market analysis.

IV. Design Concept

By Alfred Ledgin

This development concept illustrates several goals for the Truman Sports Complex site. In designing the Truman Sports Complex transit-oriented development, we will develop several strategies to address the desired forms of buildings, streets, and open space on the site.

Designing for a Diverse Population

A primary goal for the Stadium City is to design for a diverse population. Peter Calthorpe (1993) outlines that, at a minimum, functioning TODs should contain a diversity of land and building uses that includes employment, commercial, housing, and public uses. For a pioneering TOD in the Kansas City region, the goal of mixed-use development is essential, in order to pursue its success via the best established means. Furthermore, one of Calthorpe's (1993) principles for TOD is to “provide a mix of housing types, densities, and costs . . .” (43). This principle helps ensure that TODs will function as affordable communities. Calthorpe (1993) states that such communities “. . . are affordable for diverse households when a variety of

housing types, at various costs and densities, are encouraged in convenient locations . . .” (43).

The depth of diversity, however, warrants further consideration. Jane Jacobs (1961) outlines four factors for generating “. . . exuberant diversity in a city's streets and districts . . .” (150). These are, in summary: (1) a mixture of primary uses, to allow people to use common public spaces for different reasons; (2) short street blocks, providing frequent places to turn corners; (3) variation in the age of buildings, to foster differing economic demands within the same district; and (4) “. . . a sufficiently dense concentration of people . . .” who are present for a variety of purposes, including residents (Jacobs 1961, 150-151).

All of these four factors are possible at the Truman Sports Complex TOD to a certain extent. With the goal of mixing land uses established, the idea of short blocks becomes a point of interest. The sports complex's current configuration includes a street system presumably designed for the primary purpose of moving motorists to and from parking spaces as

efficiently as possible. While the site will still need to retain infrastructure for parking and vehicular circulation, reconfiguring a large proportion of the ground surface to accommodate buildings and more convenient pedestrian and bicycle circulation, mostly in the southern portion, is possible and desirable.

Variation in the age of buildings, however, will not soon occur in the way that it exists in historic urban districts and cities' downtowns. The buildings designed for the TOD will all be new construction, although they will certainly age, and changes may occur in later decades. Arrowhead and Kauffman Stadiums, however, being of 1972 vintage, are historic buildings in a relative sense. Furthermore, most of the residential buildings surrounding the site are several decades old; 34% are from the 1960s, 30% from the 1950s, and 21% from the 1940s (MARC 2011). Please see Figures 3.24 and 3.27. Provided that the TOD has sufficient integration with the surrounding area, the variety of the ages of surrounding housing can help foster diversity on a larger scale.

The 119 Census Blocks within a one-mile radius of the sports complex's center currently have an average density of 0.32 dwelling units per acre (U.S. Census Bureau, 2010). This is largely due, however, to the fact that the Truman Sports Complex site, totaling 564 acres, contains no residences. Peter Calthorpe's (1993) prescription for an average density of at least 15 dwelling units per acre, for an urban TOD, can serve as a reasonable minimum for the site of the Truman Sports Complex TOD itself, and this alone would raise the average density within the one-mile radius. Achieving higher densities beyond the TOD site would require outside development efforts.

Jane Jacobs (1961), however, argues that, while densities between 10 and 20 dwelling units per acre are appropriate for a semisuburb, "... densities of this kind ringing a city are a bad long-term bet, destined to become gray area" (209). Jacobs (1961) observes that densities between semisuburban and urban levels tend to function poorly for cities, noting that densities above semisuburban levels "... are not by any means

necessarily high enough to do their share in producing city liveliness, safety, convenience, and interest” (210). Jacobs (1961) advises that, in combination with the other factors for generating diversity, cities usually need densities of at least 100 dwelling units per acre for urban vitality (212). Such high densities, however, are rare in contemporary American cities. Even Boston's historic Fenway-Kenmore neighborhood, within the studied 2,000-foot radius around the Fenway, Kenmore, and Yawkey rail stations, only has an average density of 24 dwelling units per acre, although specific blocks have densities significantly higher and lower (U.S. Census Bureau, 2010) (please see the Precedent Studies in Appendix B for this analysis). Given the Truman Sports Complex's spatially open, suburban context, meeting a density of 15 units per acre is already a challenge.

The Truman Sports Complex TOD would also benefit greatly from including a variety of housing types. The development should include apartments and condominium units in high-rise and lower-rise

buildings, all in a variety of sizes. Jacobs's (1961) advice for mixture of housing types is: “The more variations there can be, the better. As soon as the range and number of variations in buildings decline, the diversity of population and enterprises is too apt to stay static or decline, instead of increasing” (214). Furthermore, a goal of housing variety is to accommodate a diverse range of age groups, as families with children, adults living without children, and senior citizens living on their own generally have different housing needs.

Safe On-Site Transportation System

An additional, fundamental element of designing for a diverse population is facilitating a transportation system that accommodates a diverse range of modes. While a transit-oriented development, by definition, facilitates access to public transit, the site design must take care to maximize safety and comfort for pedestrians and bicyclists, in addition to accommodating automobile users, for whom the necessary infrastructure is a relatively easy provision.

As discussed earlier, short street blocks help facilitate pedestrian activity. In addition, safer pedestrian connections across Blue Ridge Cutoff would produce stronger connections between the Truman Sports Complex site and the existing commercial and residential development directly to the east.

The design of the development's internal streets is a crucial component of its transportation system. While wide sidewalks and bicycle parking would help make walking and bicycling more attractive as transportation modes, safety is the determining factor in making any transportation mode attractive. A low design speed for on-site streets, such as Calthorpe's recommendation of 15 miles per hour (1993), would aid in pedestrian and bicycle safety. The speed of vehicular traffic is fundamental because fatality rates for pedestrians hit by vehicles increase drastically after vehicles' speeds pass a threshold of 20 miles per hour (Vanderbilt 2008, 195).

Relationships of Architectural Styles

A final note about the development's goals pertains to architectural decisions for individual buildings. The two stadiums, designed in the late 1960s (Emporis 2011) and built in the early 1970s, represent the late period of mid-20th century architecture. The new buildings on the site should avoid the fashionable trends that dominated commercial and residential architecture in the 2000s decade, as such trends represent an impulse of late postmodernism to react harshly against mid-century modern architecture and instead reference the styles of earlier periods, often in an insincere manner. The new buildings on the site should adopt styles that honor the architecture of the stadiums. However, they should do this without simply reverting to nostalgic imitations of now-historic or soon-to-be-historic styles. Rather, the architectural design principles for new buildings should be flexible enough to allow contemporary and future innovations.

Information from Public Comments

A December 7, 2011 meeting of stakeholders interested in the Rock Island Corridor revealed a desire for an alternative development pattern on the Truman Sports Complex site. Many stakeholders expressed interest in locating development along Raytown Road, which forms the site's southwestern boundary. Although this would require clearing trees from the wooded area on the southwestern side of the sports complex, as well as extensive grading, developing along Raytown Road may create a smoother automobile connection between the proposed TOD and the city of Raytown. This would also move development away from the existing parking surfaces, which would ease the burden of consolidating parking spaces in structures.

However, after conducting extensive site analysis, we have found that most conditions of the land between

the southern side of the sports complex and Raytown Road are unfavorable for urban development, due to the elevation changes, soil and water table issues, and the floodplain. Furthermore, clearing and grading the wooded area would impose the loss of a natural site amenity. The wooded area already has a modest recreational trail system, and locations exist within the area for potential to expand and enhance the trail system. Instead, we propose to reconfigure a portion of the sports complex's street system in order to provide improved vehicular access from Raytown Road. Monument signs along Raytown Road will also give improved visibility to businesses locating within the transit-oriented development.

Development Typology

The following describes an example of the type of urban development we propose for this site, although the final design differs dramatically in terms of the exact spatial quantities and locations. The space between Arrowhead Stadium and the originally

proposed rail transit station leaves room for a rectangle approximately 900 feet (the length of the southern side of Arrowhead) by 600 feet (the distance between the station and the stadium). This rectangular space alone provides room for two urban blocks, each 600 feet long by 450 feet wide, measured from the center of the street. Please see Figure 4.1 for this example of development. This is a New Urbanist-style development typology, with mixed-use buildings (shown in orange) fronting onto streets and having rear alleys and rear parking lots (streets, alleys, and parking lots are shown in gray). New Urbanism is an urban design philosophy that emphasizes mixed-use development lining pedestrian-oriented streets. The mixed-use buildings have retail at the ground level and offices, apartments, or both on the upper levels. Metered, on-street, parallel parking is provided in this area. The streets are 21 feet wide, excluding 18- by 8.5-foot parking spaces. Sidewalks (shown in yellow) are at least 12 feet wide along streets, and they may include trees. Bulb-outs are provided at street crosswalks for increased pedestrian safety. Rear alleys are 24 feet

wide. Access aisle and parking space dimensions conform to Kansas City, Missouri ordinances (City of Kansas City 2012). Cross-block pedestrian paths are placed at intervals half the length of the blocks' long sides. Each block contains four building footprints of 34,500 square feet. This configuration leaves ground space for a total of 328 parking spaces within the two blocks, including eight ADA-accessible spaces.

However, we intend to modify this example to conform to the site's unique conditions, such as the presence of high-voltage power lines and the possibility of relocating the transit line. Furthermore, this development pattern will not recur throughout the entire TOD, but rather, modifications will break the pattern to allow necessary building types and to reduce monotony of form.

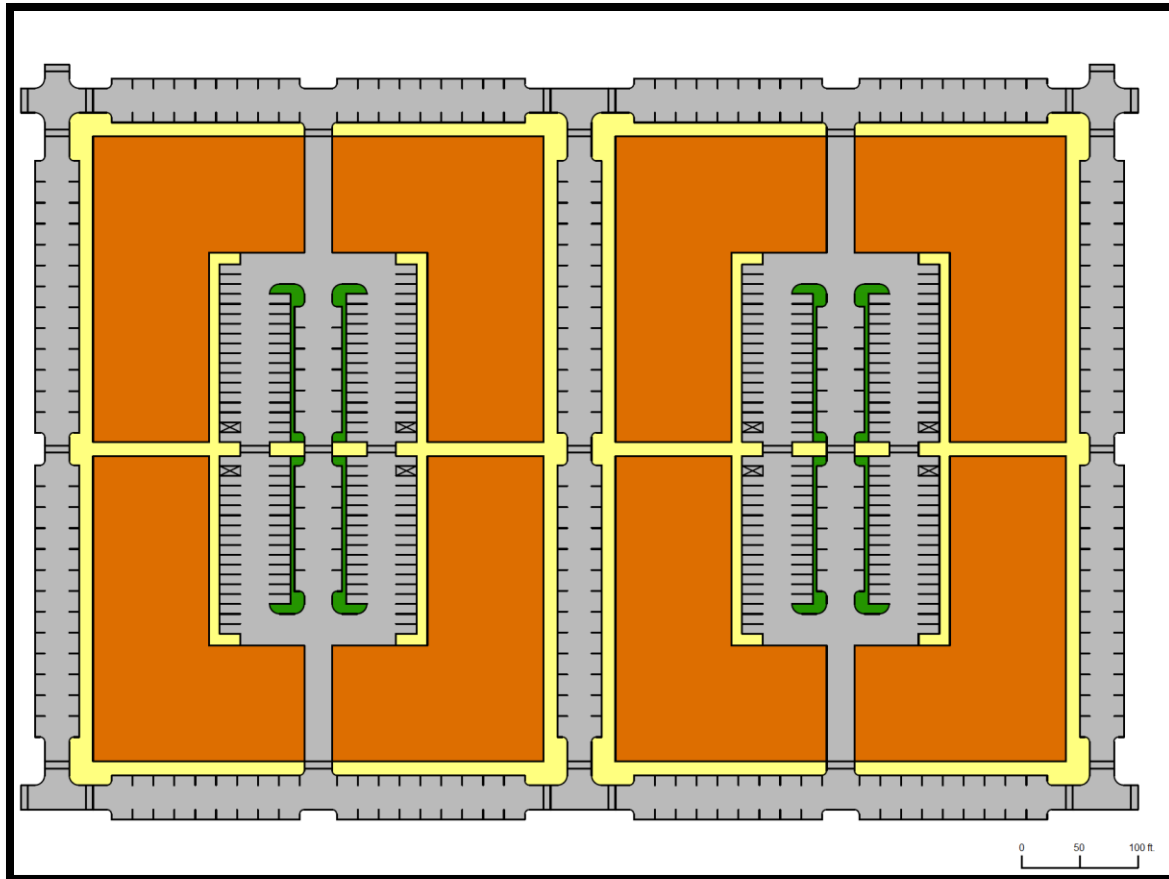


Figure 4.1. *Development typology.*

Conceptual Site Layout

The primary intent of our design concept is to concentrate buildings and activity within a compact, walkable area centered between the rail transit station and Arrowhead and Kauffman Stadiums. **In other words, our main goal is to build the development as close as possible to both the transit stop and the stadiums, so that all people occupying the site will be within a comfortable walking distance from all three features, as well as the site's various amenities.**

Limiting development to approximately a quarter-mile radius around the station will keep businesses, offices, and residences within a short walk from the station, which is one of the essential functions of a TOD (Calthorpe 1993). Most development will occur on the existing parking surface, and thus, we need to consolidate many parking spaces into garages.

The first major site change is to relocate the Rock Island transit line and the proposed station, so that the line passes between the stadiums, and so that the

station location better serves the development as a whole. The originally proposed station location primarily serves Arrowhead Stadium, but the new alignment will provide an optimal location for the transit stop. Furthermore, it will allow surrounding development to activate the space between the two stadiums, which is currently a parking lot approximately the size of a city block (420 by 960 feet). Please see Figure 4.2 for a map of the proposed corridor realignment and station location, as well as Figure 4.4 for a profile of the proposed corridor alignment. The rail corridor will pass through an underground tunnel below the development. This is important because of the need to maintain grade separation between commuter rail lines and vehicular, bicycle, and pedestrian traffic. Furthermore, having the corridor underground will allow a more narrow, densely packed street for automobiles, bicyclists, and pedestrian activity at the surface level. Construction of the tunnel will need to occur during the first phase of the overall development's construction.

As an alternative, if the Rock Island Corridor is developed as light rail transit instead of commuter rail, a viable, less costly option would be to run the transit line along the site's central street. This would follow the same path as proposed above, but it would preclude the construction of a rail tunnel below the site. The central street would be closed to automobile traffic from its beginning on the southeastern side, to the point where the rail corridor diverges from the street, just northwest of the stadiums. This option would require signalized traffic control at all intersections along the rail corridor. The alternative alignment of the profile is also shown in Figure 4.4.

Once the rail line and station locations are established, surrounding development will take the form of urban blocks defined by buildings, lining the southeast sides of the stadiums and extending perpendicular to them. The central block will be partially developed as two-story buildings for restaurants and bars with offices and apartments above, and the center of the block will be a public plaza with

outdoor tables and seating. The station will be on the eastern side of the development, and transit riders bound for the stadiums will pass several retail, entertainment, and food and beverage establishments. Intense, mixed-use activity will be located closest to the stadiums and the station, but the buildings closest to the stadiums should be limited to mid-rise height in order to preserve views of the two cultural landmarks. Two additional building typologies will be set farther away from the stadiums: low-rise garden apartments to provide a more varied housing product at a TOD density, and high-rise buildings for offices, apartments, and hotel rooms. The high-rise buildings will be spaced apart widely enough to allow views of the stadiums between the buildings, and the high-rises themselves will have enviable views of the two landmark structures—a major selling point for prospective tenants.

Recreational outdoor space is an important component of Stadium City. In addition to the public space between the stadiums, the development will

include parkland for both active and passive recreational uses. Part of this parkland will include basketball courts, which require 4,200 square feet each, and tennis courts, which require 2,808 square feet each (SportsKnowHow.com 2011). The basketball courts should be open to the public, although reservations may take priority for special events. The parkland will also include leisure space with appropriately positioned trees and benches, as well as pedestrian and bicycle paths that may provide some alternative routes for non-motorized transportation.

We propose to preserve most of the wooded area between the parking lot and Raytown Road as a natural area with recreational trails. The existing trails already provide an extensive recreational area, and a wide trail that runs from the parking lot, just south of Arrowhead, west and then south to Raytown Road, can be improved for biking and jogging. Furthermore, this proposed improved trail may be connected with a large trail system that runs west from the sports complex to downtown Kansas City. The wooded area contains

dramatic topography as well as an attractive clearing, which we propose to incorporate as one of the site's strongest landscape features. Preservation of this area will strengthen the unique character of this site by maintaining the juxtaposition between naturalistic, semi-rural ground characteristics and infrastructure-driven, intensely visited urban activity, both of which exist within the site's broader suburban context.

In order to improve automobile access from Raytown Road, we propose to reconfigure the site's internal streets so that automobile access from both Blue Ridge Cutoff and Raytown Road serves both the stadiums and the TOD as needed. As part of this reconfiguration, we propose to add an access road from Raytown Road, in the middle of the site's southwestern edge, approximately halfway between the two existing Raytown Road entrances. This new access road will run from Ozark Road and across Round Grove Creek, connecting to a street that runs along the east side of Arrowhead Stadium. Please see Figure 4.3 for our

design concept. The next chapter provides more detailed explanations of our design decisions.

Corridor and Station Relocation (Slope Shown)

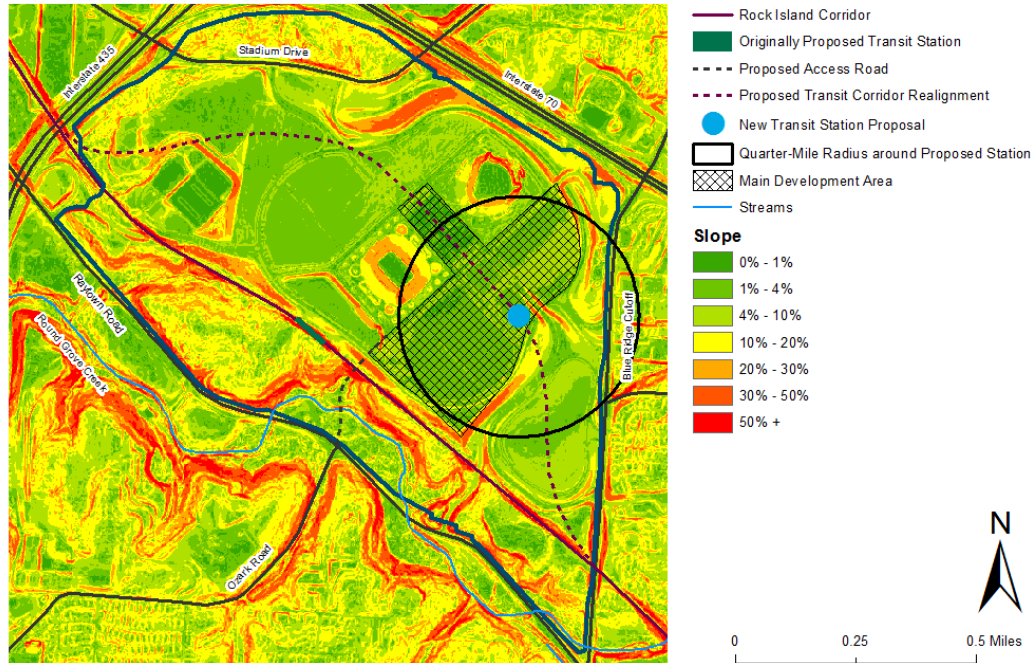


Figure 4.2. Transit corridor realignment.

Land Use and Street Reconfiguration

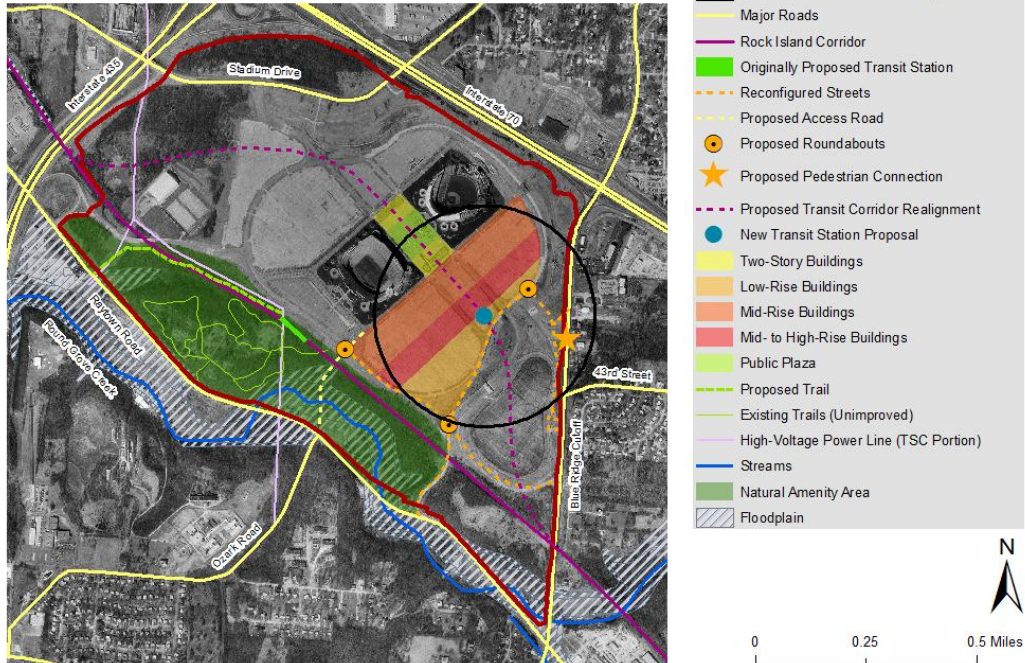


Figure 4.3. Design concept.

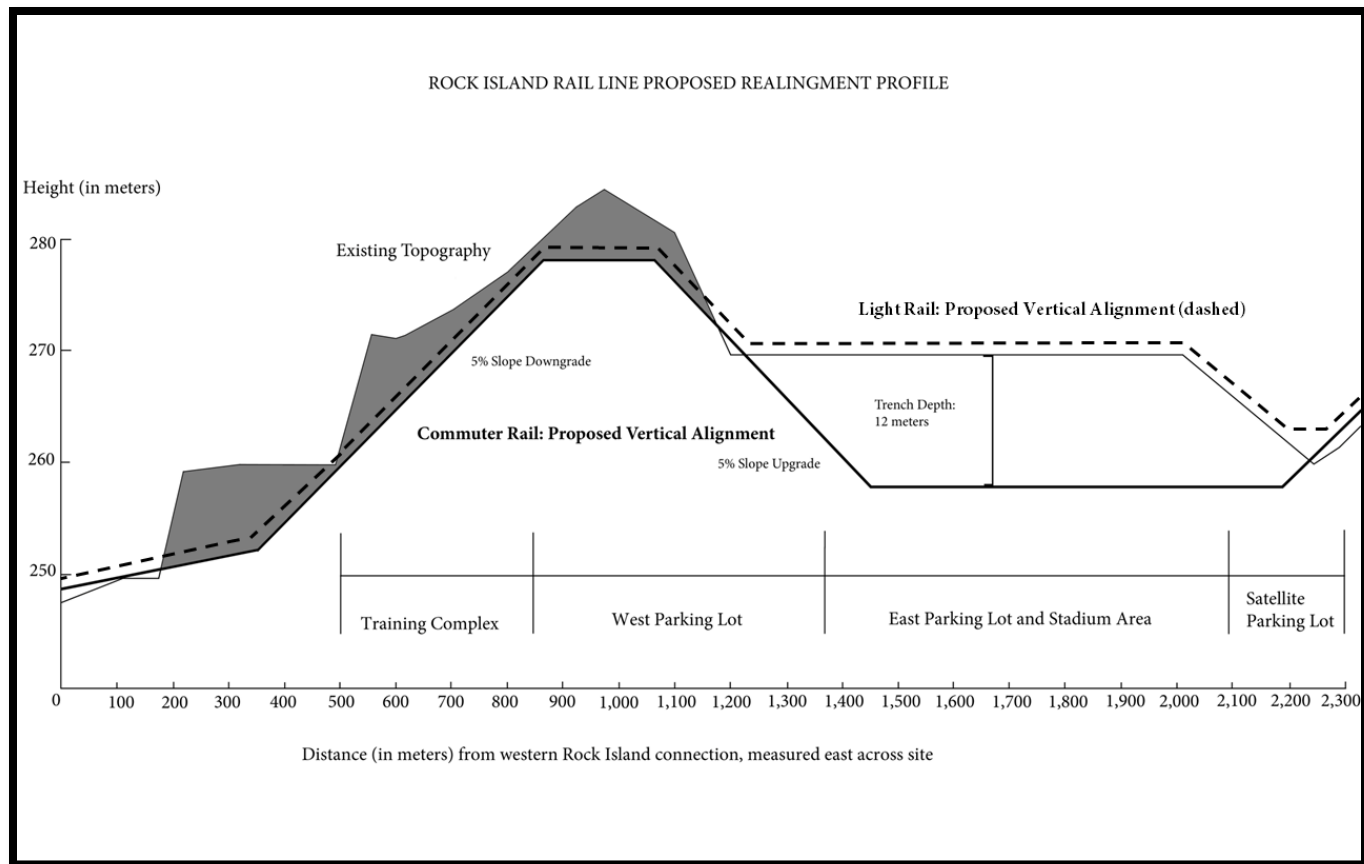


Figure 4.4. Vertical rail line realignment profile.

The Experience

Much of the intent of this design concept is to provide a specific type of experience for transit riders, residents of the development, attendees of sporting events, office workers located on the site, and shoppers patronizing the development's various businesses. The experience of such a mixed-use district relates to the principles of transit-oriented development. In *The Next American Metropolis*, Peter Calthorpe (1993) presents what he calls “the traditional American town” (21) as a model for TODs. He describes the experiential qualities of such places in terms of their land use characteristics, beginning with the statement:

Imagine a village green with daycare, recreation, and a town hall surrounded by homes and fronted on one side by a retail center. . . . This area would contain libraries, post office, and professional offices as well as a transit station. (Calthorpe 1993, 22).

Calthorpe (1993) adds, “. . . the park and recreational facilities could be used by shoppers, on-site workers, transit riders, and of course neighborhood kids” (22). The important point to draw from this description is that the people experiencing such a place are there for a variety of reasons and perhaps come from a variety of backgrounds. Furthermore, a fundamental principle is that such an environment is walkable, meaning that people can safely and comfortably walk through it to reach a variety of destinations within a reasonable amount of time, even though the concepts of comfort and reasonable trip length vary on an individual level.

With this in mind, one can conclude that people walking through a transit-oriented development or a traditional American town will pass by a variety of land uses, including civic, commercial, residential, and recreational, and they will pass by a variety of people—office workers arriving from a transit stop, parents taking their children to daycare, shoppers visiting a variety of stores, nearby residents taking leisurely walks, and so on. This is essentially the experience of a

development designed for a diverse population. Calthorpe (1993) cautions, however, that such a development cannot emulate a traditional American town in a literal manner. Because certain types of businesses and institutions have evolved to demand larger floor areas and centralized organizational structures, a mixed-use development must adapt to meet these demands without sacrificing high-quality accessibility to pedestrians, bicyclists, and transit riders. Calthorpe (1993) recommends, “hybrid town centers should combine the intimacy of Main Street with the accessibility of strip centers. From the neighborhood side, the commercial center must be pedestrian-friendly[;] from the arterial it must be auto convenient” (22).

While Calthorpe's guiding principles for the experience of a TOD are essential to the design of this development, the experience of this specific development will also be different in many ways because of the presence of the sports stadiums and the increased activity on game days. Providing a unique

and interesting experience for game attendees is important to the development of this site, and it is a guiding factor in several siting and land use decisions. Game attendees who arrive by rail transit will depart the train below ground and climb stairs or use an elevator to reach the upper floor of the station. After exiting the station at street level, these visitors will walk along a pedestrian-oriented street lined with various retail establishments, including vendors of sports memorabilia. The buildings will vary in height and will contain offices and apartments on the upper floors, as evidenced by their many windows.

After walking in a straight line for approximately 900 feet, the visitors will notice the presence of the stadiums on both sides, but they will also encounter a collection of two-story buildings containing bars and restaurants of various types. In the center of the area between the two stadiums, visitors will find a wide plaza with landscape features, tables, and seating. This area will include counter-service restaurants, so that guests will have the option of dining in the outdoor

space between the sports venues. This central plaza will be an attractive place to linger before and after sporting events. In addition, because of its surrounding restaurants and bars and its direct connection to the rest of the development, this area will remain viable for activity even on days when the stadiums are not being occupied.

At the end of a sporting event, visitors returning to the transit station will pass through the same pedestrian-oriented corridor. A theater will be conveniently accessible from this path, and visitors may wish to experience this additional form of entertainment in order to extend their day out. Visitors may also wish to visit the many bars and restaurants that they passed on their way to the game. This main pedestrian corridor will remain active at most times of the day and during all days of the week because of its central location in the development and because of its wide range of uses. Locating the station a short but significant distance away from the stadiums is important because it gives visitors the experience of

passing several businesses on their way to and from events being held at the stadiums.

One must note that the experience of Stadium City will be different for people who live there, since they will experience the site on a daily basis and will usually be there for reasons unrelated to professional sports. Many residents living in studio, one-, two-, and three-bedroom apartments will live on the upper floors of mixed-use buildings, where they will have views of street life, and some will even have views of the stadiums. These residents will be able to walk downstairs or take an elevator to the street level, where they will have quick access to retail, restaurants, bars, and entertainment venues. A full-service grocery store will also be included in the development, located for convenience to all residents traveling by car, bicycle, or foot. Perhaps most important, the rail transit station will be within a 2,000-foot walk of all residents and within a quarter-mile of most.

Residents living in the lower-rise garden apartments will experience a location at a slightly greater distance

from the stadiums. Although this location will be slightly quieter and less intensely used than the areas adjacent to the sports venues, it will have virtually the same level of convenience offered by the upper-floor apartments in the mixed-use buildings. Furthermore, the mixture of garden apartments and other low-rise buildings on the eastern portion of the site will complement the single-family houses and low-rise commercial buildings on the east side of Blue Ridge Cutoff. Most of these garden apartments will have views of other low-rise buildings, although the ones at the periphery of the development will look onto the less-developed portion of the site and across Blue Ridge Cutoff. Since garden apartment buildings will be almost exclusively residential, residents living in these buildings will have slightly quicker automobile access in comparison to those living in the upper-floor apartments or mixed-use buildings, and this amenity will factor into rental and sales prices.

Although the experience of the Truman Sports Complex TOD will vary for the site's many different

users, the experience for everyone on the site will be shaped by the simultaneous presence of two professional sports arenas and a wide variety of program including various retail, dining, and entertainment options. To characterize the development as an exciting place to live or visit would represent a drastic change in the current general qualities that characterize the site for most days of the year. The presence of a nature preserve, tall buildings, urban public spaces, and high-profile venues all on the same site and within walkable distance from one another would be a new experience for the Kansas City region, and one with the potential to attract a broad population. The specific details of this development's design will shape the way thousands of people move, think of, and remember this unique site.

V. Final Plan

By Kevin Credit and Alfred Ledgin

Explanation and Description

The practical principles guiding the completion of our plan derived from the need to implement a complex, mixed-use program in a compact urban district, spatially defined by a rigid street-and-block system. According to the Urban Land Institute, “. . . the best place to start the conceptual design of a mixed-use development is with the public spaces and the circulation system. . . . To do so means defining the nature of the space between the buildings. . .” (Schwanke 2003, 174). We considered the inclusion of two main streets, lined with mixed-use buildings and crossing each other perpendicularly, to be a desirable element in the development. Therefore, the block system consists of four long blocks in the direction parallel to the stadiums and two short blocks in the direction perpendicular to the stadiums. This pattern creates a total of eight urban blocks, plus an extra block on the southeastern portion of the site. The stadiums line this pattern on the northeast, and the sports

complex's ring road lines the remainder of the development. Please see Figure 5.1 for a map showing the development's circulation system. The models of Arrowhead and Kauffman Stadiums included in this chapter were developed by “exoticcarguy” (2010).

Another driving force behind our design is the public plaza between the two stadiums, which is bisected by the main street that runs from the northwest side of the site to the southeast. The stadiums bound this plaza on the northeast and southwest sides, and four two-story mixed-use buildings bound it on the northwest and southeast sides. In addition the natural area bordering Raytown Road provides much of the site's public space, as it provides an excellent location for a large park, programmed with basketball and tennis courts, on its eastern side, facing the southern edge of the development.

With the main public space defined, parking becomes the next concern. The location of the planned parking garages are shown in Figure 5.1. Because one of

the primary goals of a transit-oriented development is to create a pedestrian-friendly environment, the location of parking—something that consumes a significant proportion of the development's space—is crucial to achieving of this goal. One of the long-standing tenets of New Urbanist planning is to avoid front parking lots—parking lots that separate buildings from the streets that they front—and instead use rear parking, as well as on-street parking where possible. Regarding the provision of parking in urban developments, Duany, Plater-Zyberk, and Speck (2000) note:

... [I]t is important to remember that *where* is more significant than *how much*, and that the quality of the street space comes first. An essential rule of thumb is to provide no more off-street parking than can be concealed behind buildings. ...” (208)

The American Planning Association (2006) provides specific guidance on parking areas in TODs, as it relates

to the pedestrian experience, stating:

When surface parking is needed, locate it on the side or rear of buildings. Visually screen parking areas with vegetation areas or create urban blocks that allow for screening of parking structures with residential units or retail on the street level. (451)

Our parking strategy relies mostly on providing multi-level garages in the interiors of all of the development's urban blocks, except for one. Table 5.1 provides a detailed description of the size of each planned garage. The heights of these garages range from two to five stories below ground and three to five stories above ground. The only garage not located in the interior of an urban block is the large, long garage immediately west of Arrowhead Stadium, which stands alone but just across a street from urban building fronts. Each of the block-interior garages is surrounded by buildings on all four sides, and these buildings either come close to the height of the garage or exceed it by several stories. Each garage has two

entrances, in order to provide access on different sides and from different streets. Most garage entrances are on the long sides of the blocks. This pattern is intended to avoid unnecessary disruption of the street space on the main street that runs from the transit station, to the area between the stadiums, and to the northwest. However, some garage entrances are on the short sides of blocks, in order to avoid having an entrance directly from the ring road, which we have reserved for a freer flow of traffic.

The relationship between buildings and program is the next concern in our design, although this will have perhaps the most significant effect on the experience of people using the site. The siting and massing of buildings on this site is a form-based strategy. Our design concept of locating mid-rise buildings next to the stadiums, high-rise buildings farther away, and low-rise buildings at the edge of the site, governs this strategy. In our plan the four blocks closest to the stadiums are each lined with four-story buildings, mostly mixed-use. These buildings are dwarfed by the

stadiums but still provide strong enclosure of the street space.

One block away from the stadiums, a series of taller buildings lines the main street that runs parallel to the sports venues. From a distance, the most noticeable features of this part of the site are four towers, each spaced a block apart and forming a height pattern that starts with a 15-story tower on the southwest and proceeds to a 20-story tower, repeated once. The two 20-story towers are office buildings, the western 15-story tower is an apartment building, and the other is a large hotel, with apartments on the upper floors. All towers except the hotel have commercial program on the first floor. The buildings between the towers, on this side of the street, range from eight to 10 stories, and these are also predominately mixed-use buildings. A nine-story building fronting the central street contains the southbound transit station entrance, while the 15-story hotel tower fronting the street on the other side contains the northbound transit station entrance. On the other side of this block, proceeding away from

the stadiums, is a series of low-rise buildings, which includes garden apartments, a grocery store, and a theater. Most of these buildings, being the farthest away from the stadiums, front onto the ring road, although some front onto a small street that extends for only one block, and others front onto streets that intersect perpendicularly.

Our strategy for locating housing on the site represents a mixed configuration. Schwanke (2003) notes, “Mixed-use projects frequently include a mixture of residential configurations, often mixing housing over retail with other housing types” (193). He cites the examples of Celebration, Florida, and Orenco Station, Hillsboro, Oregon, which both employ this strategy. Stadium City’s studio, one-, two-, and three-bedroom apartments each come in two locational formats: the upper floors of mixed-use buildings and the apartment tower, and three-story garden apartments (please see Kevin Credit’s Development Program chapter for more information).

The garden apartments are unique in this development because the lots on which they sit only have 50-percent ground coverage. This leaves room for landscaped setbacks and rear courtyards or common areas. The lots in the higher-intensity portions of Stadium City have between 65- and 80- percent ground coverage, except for the two-story buildings next to the stadiums, whose lots have 100-percent ground coverage. With the exception of the garden apartments, all buildings will line or come very close to the sidewalk. The 20-percent open space on the mixed-use lots leaves space for light and air between the buildings and the garages. Please see Figures 5.2 for three-dimensional renderings of Stadium City’s site design, which show building heights, as well as probable relationships between buildings and streets. One unique aspect of this site design is that low-rise and high-rise buildings share lot lines, although the buildings will not touch, since a significant distance of landscaped open space will separate them. This creates a rare and exciting juxtaposition—one which is not found in many New Urbanist developments.

Table 5.1. *Size and height of planned parking structures.*

Garage #	Width	Length	Sq. Ft.	Stories	Lot Coverage	Total Sq. Ft.
G1	180'	420'	75,600	10 (5 above ground, 5 below ground)	100%	756,000
G2	180'	300'	54,000	10 (5 above ground, 5 below ground)	100%	540,000
G3	180'	240'	43,200	10 (5 above ground, 5 below ground)	100%	432,000
G4	180'	300'	54,000	10 (5 above ground, 5 below ground)	100%	540,000
G5	120'	360'	43,200	5 (3 above ground, 2 below ground)	100%	216,000
G6	180'	300'	54,000	8 (4 above ground, 4 below ground)	100%	432,000
G7	120'	240'	28,800	4 (2 above ground, 2 below ground)	100%	115,200
G8	180'	240'	43,200	5 (3 above ground, 2 below ground)	100%	216,000
G9	240'	720'	172,800	8 (5 above ground, 3 below ground)	100%	1,382,400
Total						4,629,600

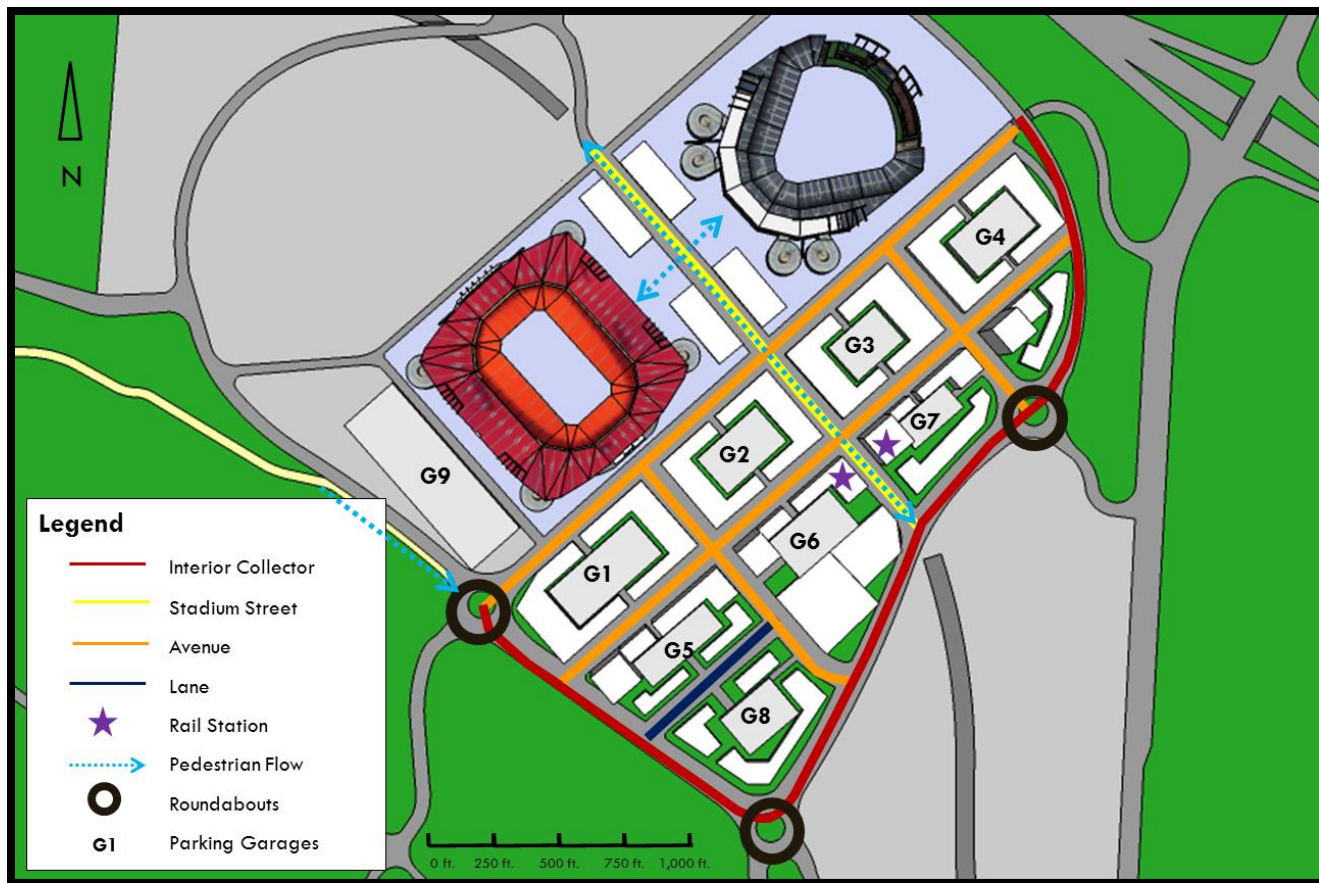


Figure 5.1. Interior circulation and proposed parking garage locations.

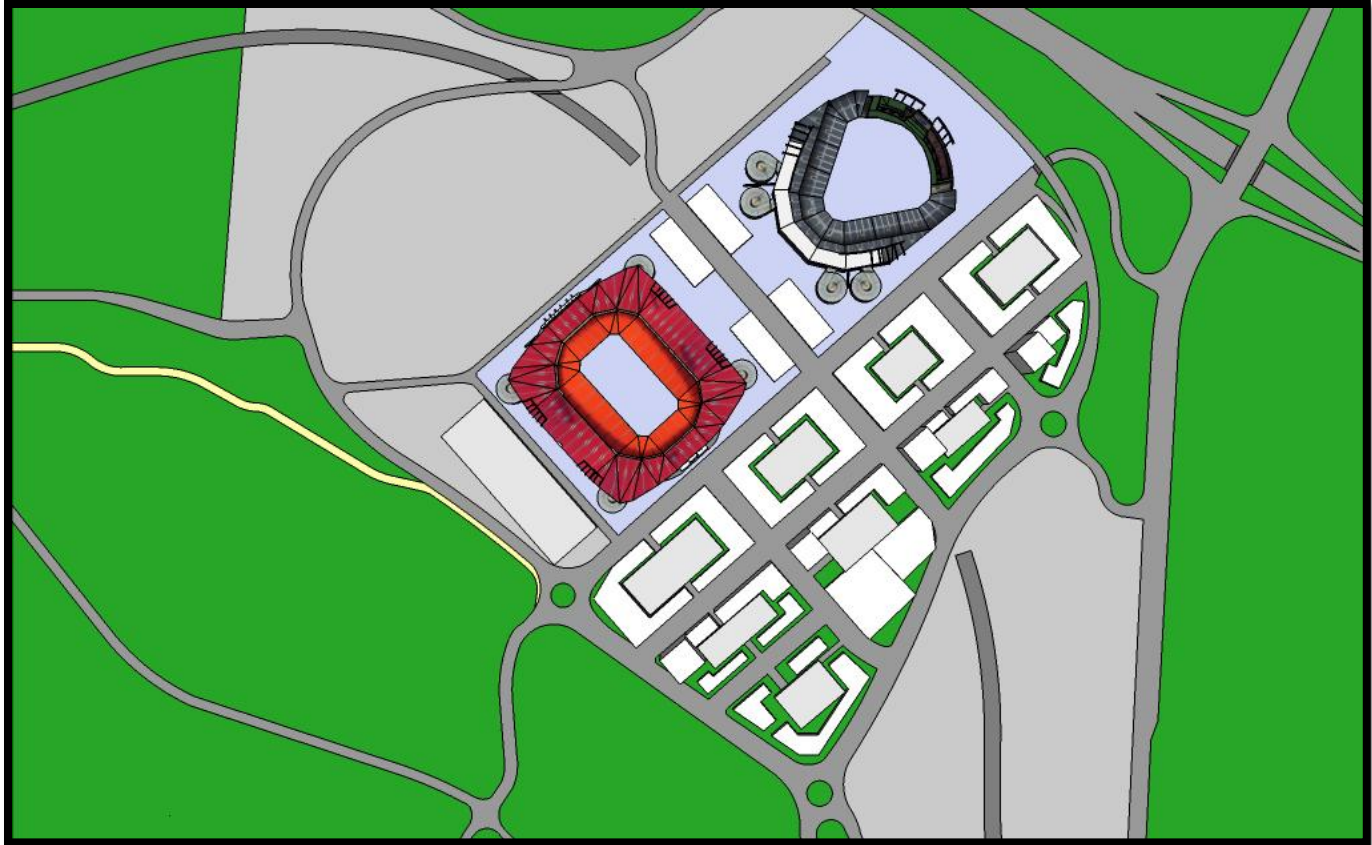


Figure 5.2. *3-D Model aerial view of Stadium City.*



Figure 5.2a. *View of Arrowhead from Stadium City.*

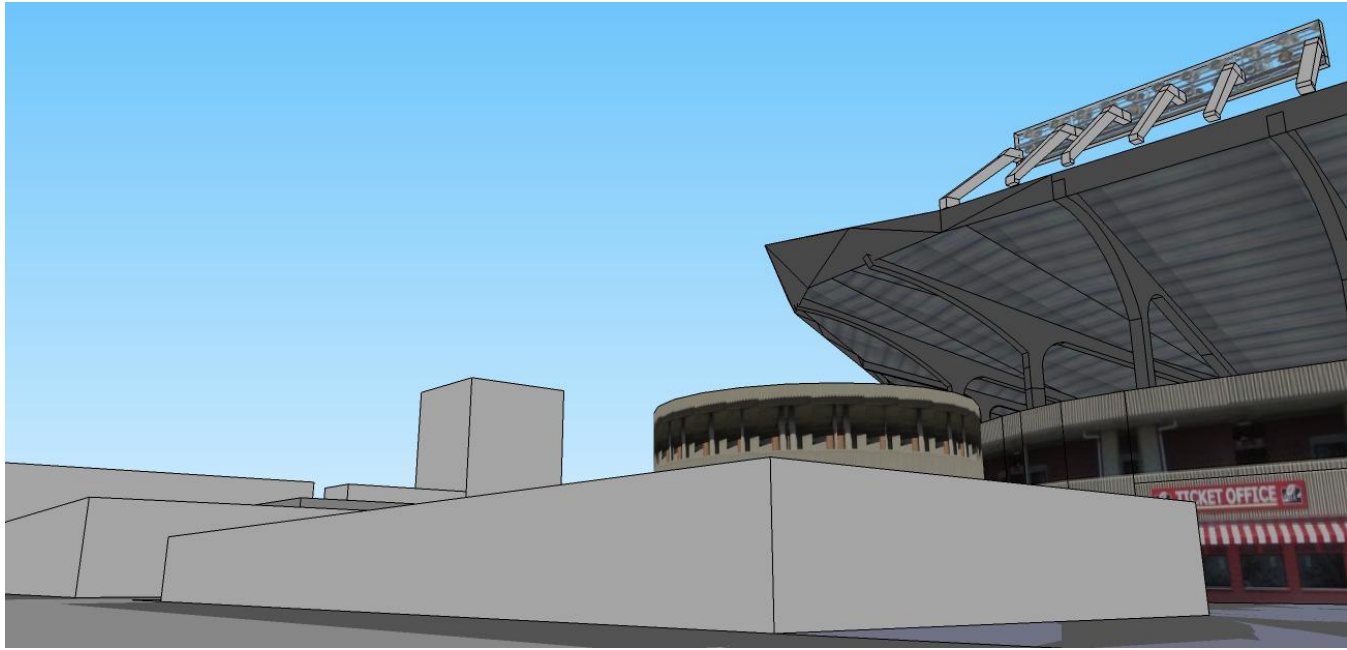


Figure 5.2b. *View from inter-stadium plaza.*



Figure 5.2c. *View of inter-stadium plaza area.*

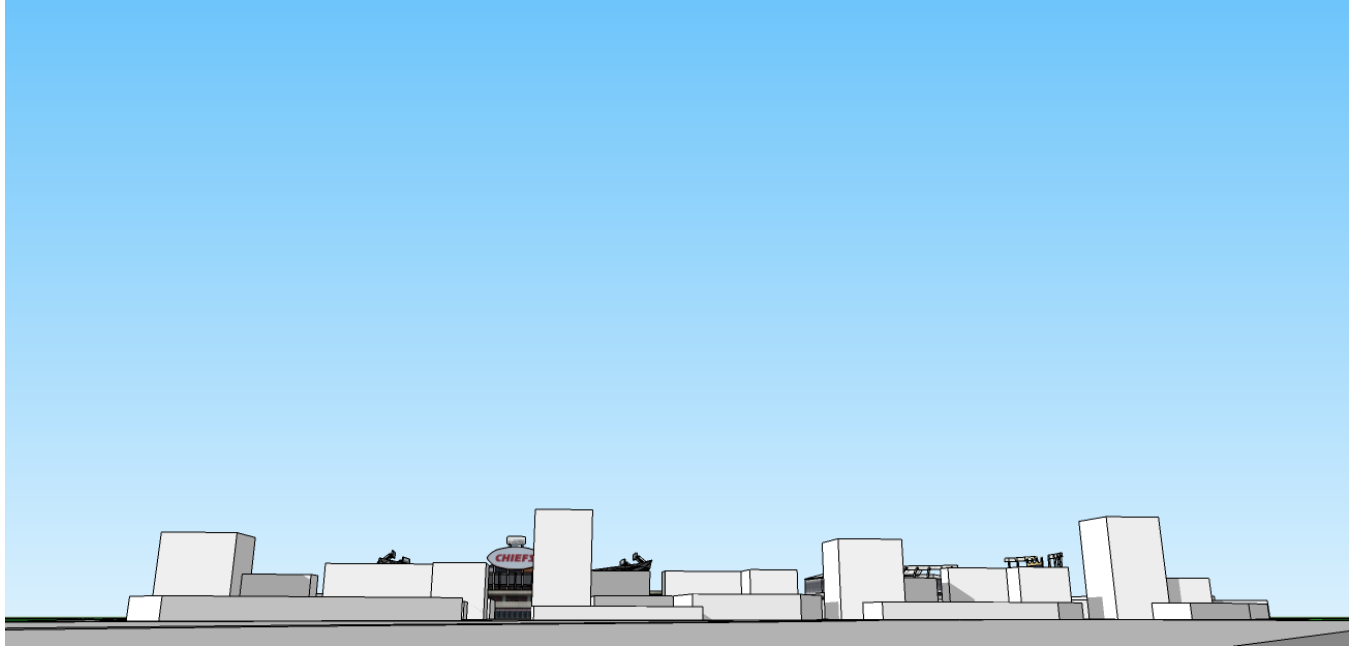


Figure 5.2d. *View of Stadium City from Blue Ridge Cutoff.*

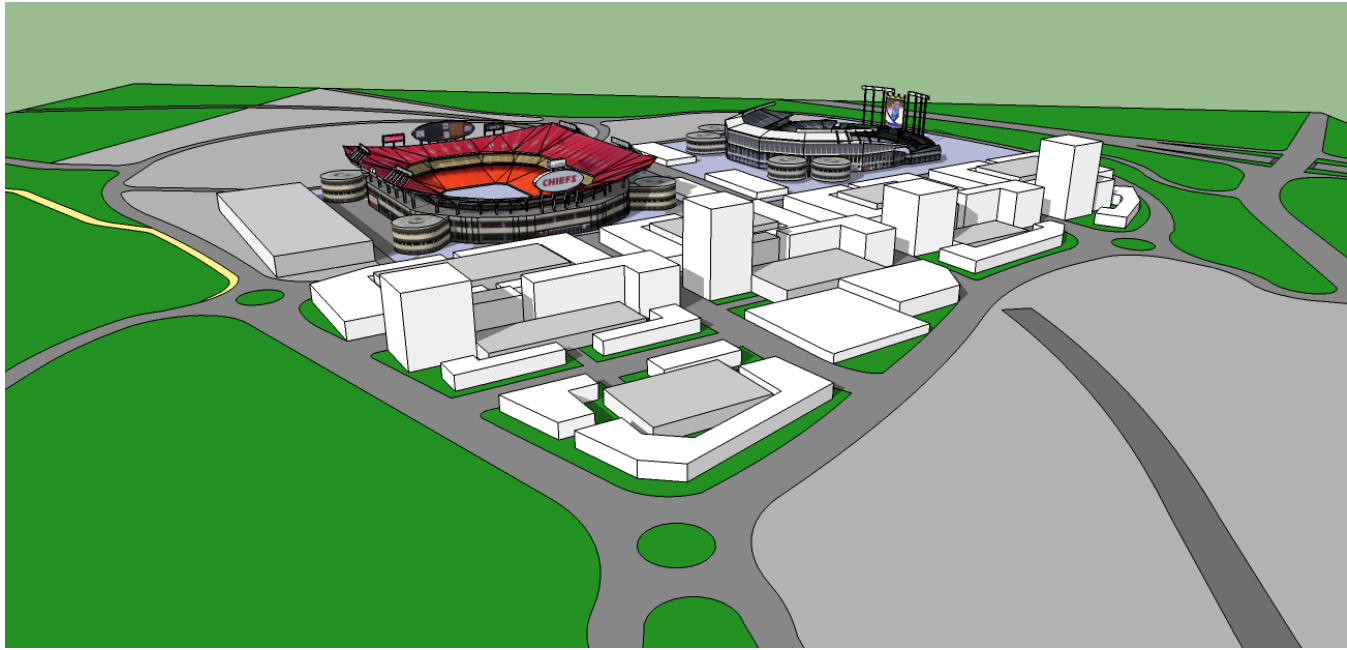


Figure 5.2e. *Overhead view of Stadium City.*

Streets

We divided the development's circulation system into four street typologies. This classification system defines a hierarchy of internal streets, functioning within the traditional road hierarchy formed by freeways, expressways, arterial roads, collector streets, and local streets. Stadium City's internal roads function at the levels of collector streets and local streets within the broader city's hierarchy. Starting at the level of city-scale collector streets and moving down to local streets, the development's functional classification system consists of the interior collector, Stadium Street, avenues, and a lane. Please see Table 5.2 for a list of characteristics of these street types.

Class One of the development's street system consists of the interior collector, which is the eastern portion of the sports complex's original ring road. This is Stadium City's most automobile-oriented street, with a design speed of approximately 30 miles per hour and two through lanes in each direction. It has the highest level

of traffic flow with the lowest level of access. The entire right-of-way is 94 feet wide, and this includes a 16-foot median, which separates directions of travel and provides space for left-turn lanes. The through lanes are each 12 feet wide. Five-foot-wide planters separate the roadbed from the 10-foot-wide sidewalks. Please see Figure 5.3 for the section view of the interior arterial.

Class-Two consists of Stadium Street, which is the main pedestrian-oriented corridor on the site. Stadium Street runs between the stadiums and perpendicular to them, and much of the site's commercial activity will face this street. Furthermore, the transit station has entrances on opposite sides of Stadium Street, which stretches from the interior collector to the plaza between the stadiums, and then transitions into the road that connects to Stadium Drive on the west. Stadium Street has a design speed of approximately 20 miles per hour and has one through lane in each direction for automobiles. This street has a higher level of access and a lower level of traffic flow. The total

right-of-way is 90 feet wide. This includes two 10.5-foot through lanes, two 8.5-foot parking lanes, two six-foot bicycle tracks, and 6-foot planters and 14-foot sidewalks on either side. Please see Figure 5.4 for the section view of Stadium Street. The parking lanes will terminate in advance of intersections, in order to provide room for left-turn lanes.

The alternative of running a light rail line at grade, rather than routing the transit line below ground, requires a different typology for Stadium Street. This street would be dedicated to the light rail right-of-way and would be closed to automobile traffic. The light rail alternative for Stadium Street is still a pedestrian-oriented street with a high proportion of the development's commercial frontage facing this street. In each direction it consists of a 12-foot track space, a four-foot boarding area, a six-foot-wide planter, a six-foot bicycle lane, a four-foot vegetated buffer zone, and a 14-foot-wide sidewalk. Please see Figure 5.5 for the section view of the light rail alternative to Stadium Street.

Class-Three streets are termed “avenues.” These are lower in the hierarchy than Stadium Street, and they use shared lanes for automobiles and bicycles, but they have an otherwise similar sectional configuration and also have a 20-mile-per-hour approximate design speed. Avenues will also have commercial store frontage, but they will have a higher proportion of less active uses, such as office and residential buildings, than Stadium Street. They run both parallel and perpendicular to the stadiums. One of the avenues terminates at the side center of Arrowhead Stadium, and another terminates at the side center of Kauffman. New Urbanist design often employs this strategy of using a landmark building to terminate a vista—i.e., “. . . the careful placement of a public building, a hallmark of traditional town planning” (Duany, Plater-Zyberk, and Speck 2000, 35). Similar to Stadium Street, the avenues have six-foot planters and 14-foot sidewalks. Please see Figure 5.6 for the section view of the avenues.

The Class-Four street is termed “lane.” The development only features one street of this type, and it serves the garden apartment buildings on the southeastern portion of the site. The lane has a 74-foot right-of-way. Its design speed is approximately 15 miles per hour, due to its length of only one block. The lane runs parallel to the stadiums. It has the same level of access as the avenues, and it has the lowest level of traffic flow. The lane’s roadbed has the same configuration as the avenues, but it is lined with an eight-foot planter and a 10-foot sidewalk on each side. Please see Figure 5.7 for a section view of the lane.

Table 5.2. *Characteristics of planned street types.*

Class	R-O-W Width	Type	Speed Limit	Ped. Friendliness Rating	Dev. Intensity Rating	Noise Rating
1	94 ft.	Interior Collector	30			
2	90 ft.	Stadium Street: Commuter Rail Option	20			
2	92 ft.	Stadium Street: Light Rail Option	N/A			
3	78 ft.	Avenue	20			
4	74 ft.	Lane	15			



Figure 5.3. *Street section showing Class 1 Interior Collector.*

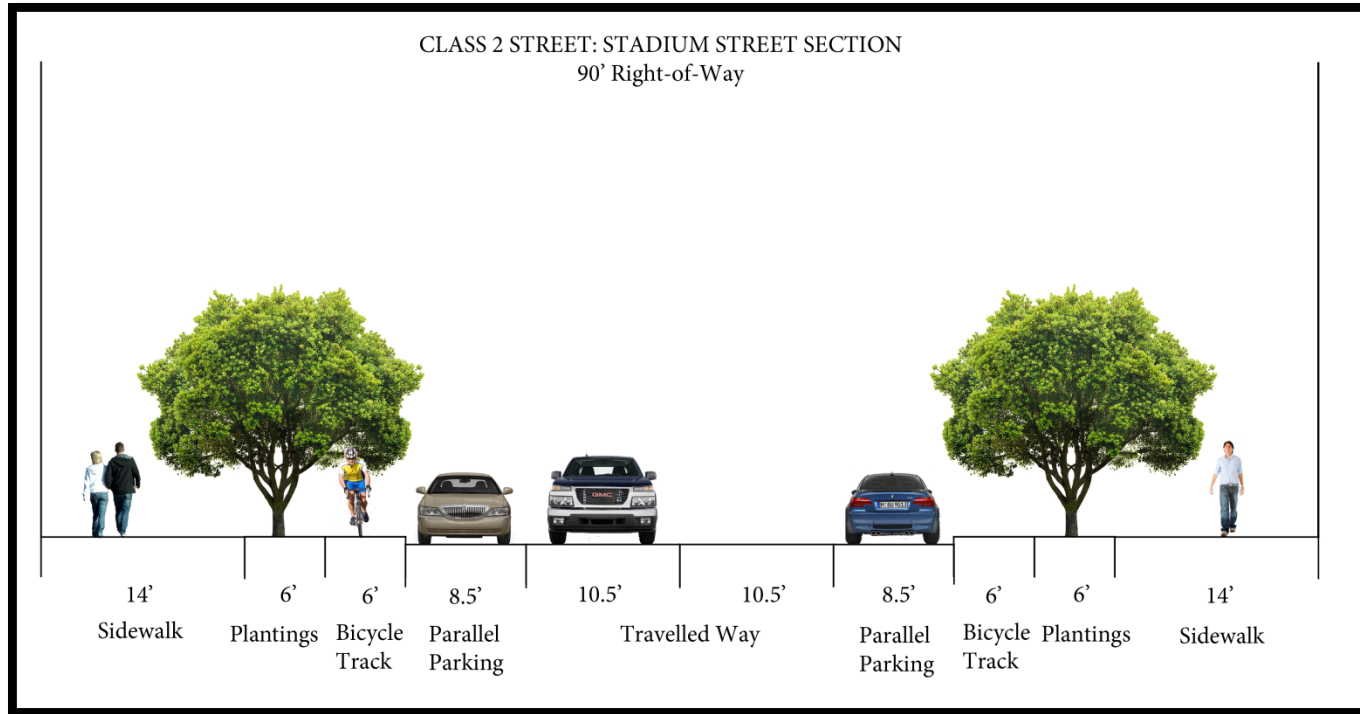


Figure 5.4. *Street section showing Class 2 Stadium Street.*

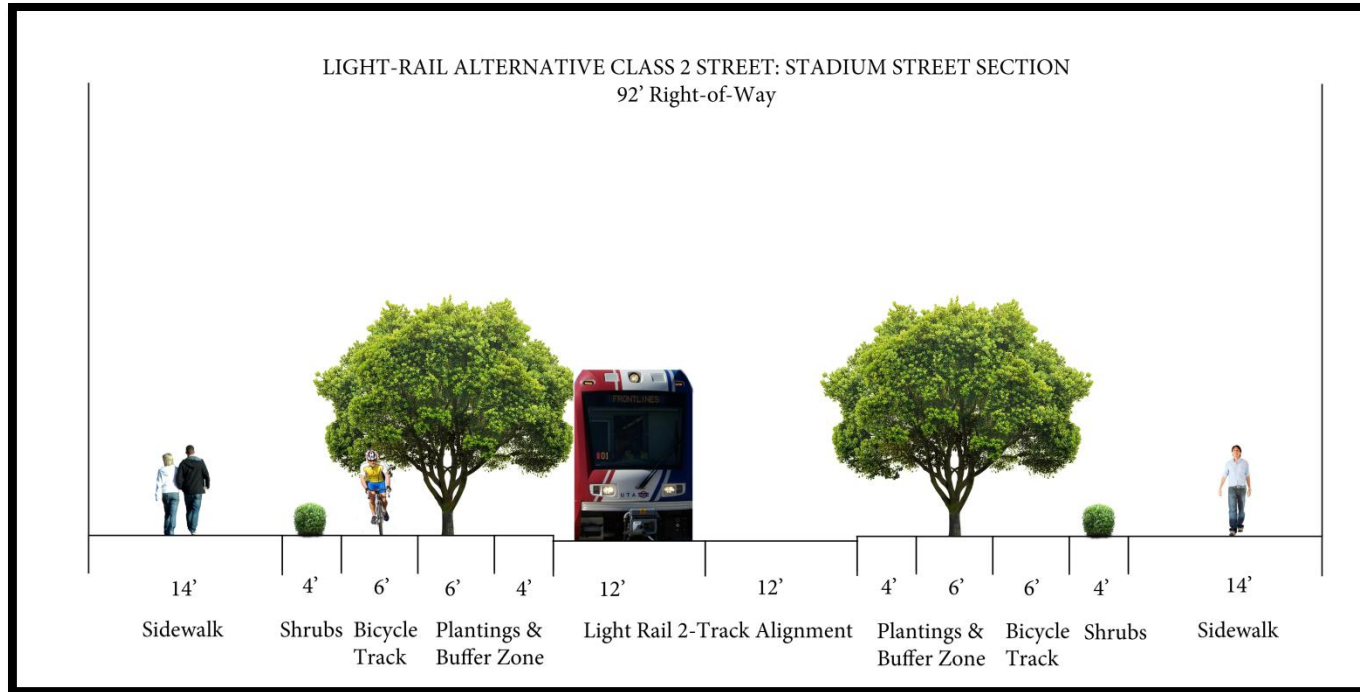


Figure 5.5. *Street section showing light rail alternative for Class 2 Stadium Street.*

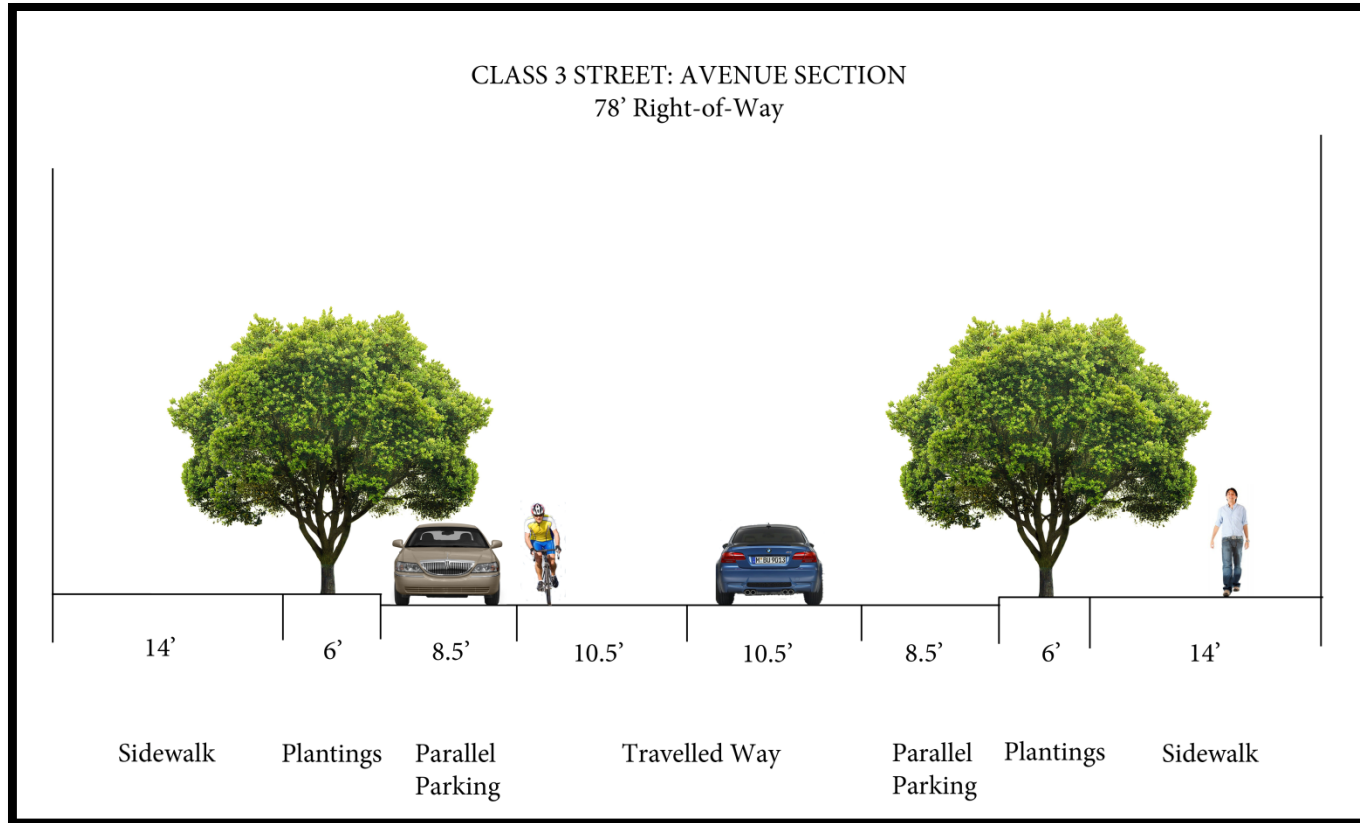


Figure 5.6. *Street section showing Class 3 Avenue.*

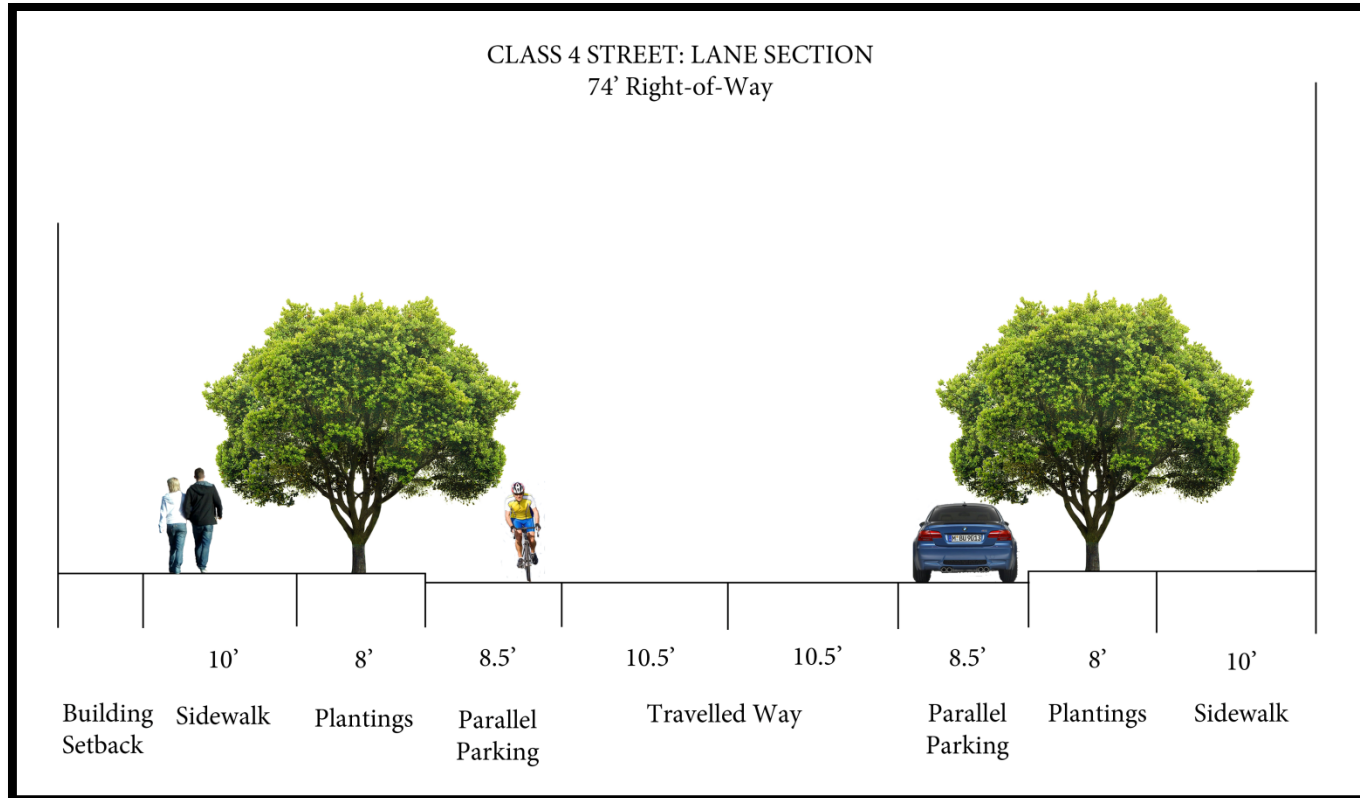


Figure 5.7. *Street section showing Class 4 Lane.*

On-Site Zoning

The plan for Stadium City divides the newly developed portion of the site into 31 lots, excluding parking garages. Seven zoning categories encompass all of these lots. The zoning categories mostly regulate form, but they also pertain to program, since certain zoning categories are tailored to specific components of the program. The zoning categories specify the proportional ground coverage of buildings on each lot, the heights of buildings in terms of the number of the stories, and the relationship between buildings and the sidewalks onto which they front. Please refer to Table 5.3 for a list of these zoning categories, as well as Figures 5.7 for their locations.

Because this is a mixed-use development, the predominant zoning category serves mixed-use program. Four different mixed-use categories serve this development, and they are differentiated by building height. M-1 is the zoning category for the two-story buildings between Arrowhead and Kauffman

Stadiums, which have restaurants and bars on most of the first floor and offices and apartments on the second. M-2 is the zoning category for four-story mixed-use buildings, and these are the buildings that fill the blocks closest to the stadiums. M-3 provides for mid-rise buildings, ranging from eight to ten stories in height. These buildings are set back one block from the stadiums. M-4 is the zoning category for the high-rise towers. These range in height from 15 to 20 stories. M-1 specifies a target ground coverage of 100 percent, while the other mixed-use categories specify a target ground coverage of 80 percent. They all specify that the buildings line the sidewalks—i.e., they have no setbacks. One of the transit station entrances is in the M-3 zone, while the other is in M-4.

The zoning scheme also includes two commercial categories. These are specialized zoning districts that serve a smaller proportion of the site in total. C-1 is the category for the development's grocery store. The single lot reserved for this category sits next to the ring road and is half a block west of the transit station, and

its target ground coverage is 65 percent. The other commercial category is C-2, designated for “entertainment.” This zoning category reserves space for the development’s theater, and it has a target ground coverage of 72 percent.

The final zoning category is R, which serves the site’s garden apartment buildings. This category covers a portion of the development that is predominately residential in both building form and land use. Lots in this category have a target ground coverage of 50 percent. This leaves space for setbacks on the fronts and sides of the buildings, as well as common areas in the backs of the buildings. Although this category mostly serves residential uses, it should not be construed as precluding commercial uses, since small corner stores at some of the site’s important intersections may be desirable.

Table 5.3. *Characteristics of zoning classifications and symbols.*

Symbol	Description/Use	Color	Target Lot Coverage	Target Height	Setback From Sidewalk
C-1	Grocery Store		70%	One-Story	N
C-2	Entertainment		72%	Two-Story	N
M-1	Two-Story Mixed-Use		100%	Two-Story	N
M-2	Four-Story Mixed-Use		80%	Four-Story	N
M-3	Mid-Rise Mixed-Use		80%	Eight- to Ten-Story	N
M-4	High-Rise		80%	Fifteen- to Twenty-Story	N
R	Garden Apartments		50%	Three-Story	Y
P	Parking		100%		N



Figure 5.8. Zoning map.

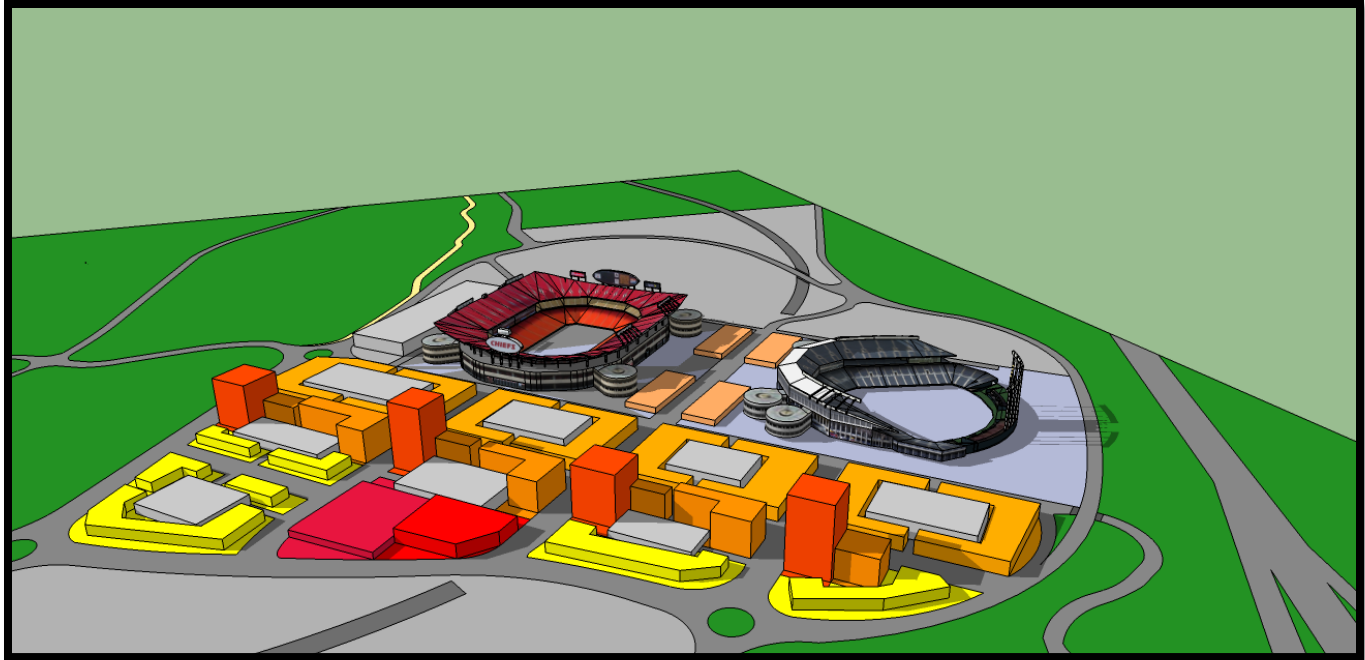


Figure 5.8a. *View of zones.*

Conclusions

This design solves the specific issue of implementing a grid-and-block layout on a significant portion of a site that has previously been defined by its shopping mall-style ring road and surface parking system. It provides active public space and urban streets defined by buildings with mixed program. Furthermore, it organizes the site into a layout that is not only functional in its relationship to the stadiums and the transit station, but which also serves an aesthetic goal of capitalizing on relationships with the existing stadiums and new significant buildings. The plan is specific enough to delineate the various contexts, forms, and activities expected to occur on this site, yet it is flexible enough to allow the program to occur in a range of functional spatial patterns, while also allowing a reasonable range of building details and specific aesthetic treatments.

VI. Summary

By Kevin Credit and Alfred Ledgin

The development of the design plan for Stadium City has been a constantly evolving process that began with identifying dilemmas and outlining project goals. It sticks to the principles of transit-oriented development while maximizing the potential of the Truman Sports Complex as a site. The plan addresses the dilemma over the future of development in the Kansas City region by introducing a denser, more walkable development type that concentrates residences, retail, and office space around a new rail transit stop. This type of development, while having small examples in certain places in the region, has not yet been implemented in this area on a large scale. The Truman Sports Complex provides a scale that allows a large urban development the opportunity to grow within ten miles of Kansas City's downtown. In addition the dilemma over the routing of the rail transit line raises awareness for the desirability of running the line between Arrowhead and Kauffman Stadiums in order to serve the site in a more convenient and effective manner. The plan also finds a way to implement a grid system in the space defined by the sports complex's ring road. It relocates parking into garages and leaves

space for a street network that is safe and comfortable for pedestrians, bicyclists, and motorists.

This study examines the local and regional context, finding that the Truman Sports Complex exists in an area lacking in population and business density relative to the rest of the region. Furthermore, the region as a whole currently relies heavily on automobile transportation, with public transit commuting comprising a small proportion of the total mode share. The project addresses the questions of urban design principles conducive to transit-oriented development in this context as well as the specific program needed to make this development economically viable. Considering an in-depth focus on the context of this site, one of the most important factors is the Rock Island Corridor, which dramatically raises the potential for an intense project on the site of the Truman Sports Complex. MARC's corridors-and-centers strategy outlined in its *Transportation Outlook 2040* regional plan activates the site as an important activity center within the regional context.

Our analysis of the sports complex site reveals a situation in which the question of further developing the site hinges on both the potential for redeveloping the extensive parking surface and the characteristics of the undeveloped portion of the site. The findings show that the undeveloped portion between Raytown Road and the sports complex parking lot imposes several challenges to development, such as extreme slope and elevation changes, high water table, and the existence of a floodplain along a significant portion of Raytown Road. Furthermore, preserving this undeveloped portion of the site as a recreational space would create a natural amenity that would be of immense value to the development. Strategic interventions such as a new entrance point to the site from Raytown Road and a new on-ramp to Northbound I-435 would aid in the functioning of the site's transportation system without excessive disruption of the landscape's natural qualities.

The development program for this project proposes the construction of 750,000 square feet of retail, over 1,500,000 square feet of office space, over 2,240,000

square feet of multi-family housing, and public space for recreation and leisure. The analysis reveals the need to build over 15,000 parking spaces in garages in order to accommodate the planned development and maintain enough existing parking on the site. The target market for the residential component of the development consists of people ages 21 to 49, specifically young professionals, households of small families, and people who value urban areas with transit-related and recreational amenities. The extensive market analysis indicates that the Stadium City project is economically viable in the Kansas City region. The plan divides the construction of this project across six phases stretching from 2017 to 2030.

The design concept for Stadium City involves creating a bowl-shaped, three-dimensional urban form, sloping upward away from the stadiums. This concept capitalizes on views of the stadiums by limiting building heights next to the iconic structures to preserve views and by providing special views from the upper floors of high-rise towers. The concept also

locates low-rise buildings on the eastern side of the site, in order to provide compatibility with the single-family residential development on the opposite side of Blue Ridge Cutoff. An important part of the concept is to relocate the Rock Island Corridor on the site so that it passes between the two stadiums. A portion of the transit corridor will travel underground, directly below the main street of the development. An alternative is to run a light rail line along the main street. This will position the transit station in a location that provides a short but exciting walk between the station and the sports venues.

The final plan for the site rests on the foundation of a street-and-block grid system consisting of streets running parallel and perpendicular to the stadiums. Four functional street classes consist of the interior collector, which provides a high level of traffic flow and functions as a collector street within the city's context; Stadium Street, which is the main pedestrian street onto which much of the commercial activity will front; avenues, which are also designed for pedestrian

viability and commercial frontage, and which provide a higher level of access for vehicles traveling to parking spaces; and the lane, which is slow and residential in nature. A zoning scheme will be instrumental in implementing the Stadium City plan. The zoning consists of mixed-use and commercial parcels with 65- to 100-percent ground coverage and a variety of building heights, specific categories for the development's grocery store and theater, and garden apartment buildings with only 50-percent ground coverage to allow landscaped setbacks and common areas. An important aspect of the plan is that it strategically locates nine garages, eight of which are on the interiors of urban blocks, surrounded by buildings so as not to disrupt any active street space.

One of the unique aspects of this development is that it juxtaposes high-rise and low-rise buildings in a way that is rare among New Urbanist projects. This unexpected tension creates visual interest for game attendees as well as daily site users. One of the most important outcomes of this project is that it creates an

opportunity for Kansas Citians to live in a walkable urban district with a variety of housing types and amenities, and it locates residents within a short walk of a stop on a rail line that will take them to both downtown and suburban Lee's Summit. This urban district maximizes the identity value of the cultural icons of Arrowhead and Kauffman stadiums, creating a unique sense of place that will contribute to the quality of life of the fortunate residents of this development. In addition to the broad range of characteristics outlined above, Stadium City is a microcosm of the argument for compact urban form. By consolidating the diverse development into a small area of land, the design preserves the important natural conditions of the site while increasing the intensity of urban activity in the site's center. The future of Kansas City holds many changes to the development pattern that has shaped the region for decades. Although it only comprises a very small proportion of the region's total land area, Stadium City is a large chapter in the Kansas City region's future. Its introduction of a new typology to the region and its relationship to two of the region's

most iconic buildings creates a synergy that propels the new project to a culturally significant point in region's history, as it relates to the region's spatial, economic, and transportation-based development.

VII. Personal Reflection

By Alfred Ledgin

Stadium City synthesizes ideas already established, ideas proposed for experimentation, and ideas yet to come. The process of designing a transit-oriented development at the Truman Sports Complex included unexpected stages, challenges, and outcomes. When initiating this project, Kevin and I envisioned a detailed product that would address several dimensions of the site's present and future. While we achieved some of our goals in developing an urban design plan, we also learned lessons about the design process that we could only gain through relevant experience.

My interest in Stadium City stemmed from my desire to design large-scale projects. I entered the planning program with the assumption that I would work on several projects ranging from conventional suburban developments to common-practice New Urbanist communities. Since we intended Stadium City to be a transit-oriented development, we planned to incorporate New Urbanist principles to a large extent. However, because this would be a capstone project, having relative importance compared to my previous work, I hoped to move beyond the New Urbanist paradigm and find more imaginative ways to solve the problems of the site and its intended functions.

We began developing conceptual ideas for our site design in the fall semester of 2011. In the beginning we had a vague intention of merging the principles of both New Urbanism and Landscape Urbanism, looking to literature by both Peter Calthorpe and Charles Waldheim for guidance. Later we envisioned a plan that would emphasize the contrast between baseball and football—the site's current predominant program—by developing a contrast between urban physical features and naturalistic settings as a metaphor for the differences in the two major-league games. We eventually developed the first iteration of the bowl-shaped scenario of mid-rise buildings next to the stadiums and high-rise buildings set away from them, in order to emphasize the sports venues as the site's major landmarks and maximize views of them.

As we proceeded to develop our site analyses and program, we found difficulty in translating our preliminary design concept into concrete solutions. We considered an alternative scenario in which the site's development would occur in a pattern of organic modularity radiating from a single intersection, inspired by the theories of Jane Jacobs (Steigerwald 2001). We found ourselves unable to grasp this concept

in a way that allowed us to explore the design's physical features at a more detailed level, so we reverted to the bowl-shaped strategy, applying necessary modifications along the way.

The site analysis and development program took a significant proportion of our total efforts. We had not anticipated the level of depth with which we had to conduct these analyses. This was my first time conducting site analysis at the scale of an individual parcel, and it was Kevin's introduction to the process of market analysis. The necessary self-education and data collection required several weeks of work, which changed the course of the project from one in which we would explore specific design details to one based more on research of practical principles.

We did take the opportunity to explore relatively experimental ideas by proposing to re-route the Rock Island Corridor through the center of the site, between the stadiums, and through our optimistic inclusion of high-rise towers in the development. The re-routing of the transit line would create an urban condition different from those of many conventional TODs by running the line through an underground tunnel, thus

adding a layer of three-dimensionality. As an alternative solution, we proposed running a light-rail line at grade on a dedicated street—the main street of the development—in order to provide a lower-cost option. The high-rise buildings would create additional three-dimensionality by extending the development height beyond the low- to mid-rise building line usually achieved by New Urbanist developments in suburban contexts as well as the traditional small towns they aim to emulate as models.

One of the unanticipated challenges of this project was the need to change the program based on design requirements. We had initially proposed townhomes with individual garages as part of our development, in order to provide a wide variety of housing types at the density needed for TOD. Although we explored an innovative solution to fit spatial constraints by turning the townhomes perpendicular to the street and using walking paths and cul-de-sacs for their access, inspired by Radburn, we quickly realized that even this strategy was not sufficient to place our originally proposed number of townhomes in a pattern that functioned well in terms of distance from the proposed transit station. So we substituted three-story garden apartment

buildings for the originally proposed townhomes. This required an extensive change to both the program and market analysis. Because the site analysis revealed the most desirable location for the site's development, it indirectly informed the market analysis and program through this process. A later change in the development's phasing scheme reintroduced this challenge on a smaller scale.

The final product involved a lower level of detail than we had originally envisioned, as well as fewer of the intellectual concepts we had hoped to explore. However, it provided us with experience in site analysis and market analysis that will be of great value as we continue to work in planning. Furthermore, the lessons from this design process will help to guide us in future design endeavors, as we will have to work through the various stages of design concepts and research, as well as determine the level of detail to pursue given the specific challenges of a project.

The ideas yet to come for Stadium City are those that the project's time frame and level of detail prevented us from developing. I had personally hoped to explore ideas pertaining to specific aesthetic qualities of the

development. For instance, opportunities to explore more specific views both of and from the rail infrastructure, as well as strategies for exploiting natural light on the site, were both interesting design strategies that I would have considered given the necessary time and scope for such endeavors. Furthermore, I had hoped to create a better juxtaposition of scales, given the proximity of a proposed pedestrian-oriented site to two Interstate highways, which creates the opportunity to develop interesting forms of interaction between the pedestrian and high-speed automobile scales. I had also considered the idea of reintroducing towers in a park and finding a way to integrate the classic modernist concept with the ideal of active street frontage. Kevin had hoped to explore issues of placemaking and cultural identity, using Arrowhead and Kauffman stadiums as icons around which to develop the site as not only a regional center but also as a way to bring together people from various backgrounds. In addition we had both hoped to pursue ideas of green infrastructure and innovative stormwater management solutions.

If Kevin and I were to do the project differently, we would probably begin site analysis and market analysis at an earlier stage, substantially completing them before the start of the final semester. This would give us more time to explore interesting design concepts and to develop a greater level of detail in our site plan. Furthermore, I would propose a smaller-scale project with a smaller program. Although this would preclude certain opportunities for bold proposals such as relocating the rail corridor, it would provide the opportunity to explore more interesting and more unique ideas for the project's design, and it would allow us to work at a finer level of detail. In addition, a smaller-scale project would not preclude future expansion, and we would design ours in such a way as to accommodate expansion in the most flexible manner possible.

The Stadium City project has both satisfied some areas of our intellectual curiosity and raised new questions pertaining to urban planning and design. It creates a model to inspire people to consider the potential in both the specific location and in the region for a project of this nature, with its bold proposals and design concepts. The future holds many possibilities

for Kansas City and the Truman Sports Complex, and developing Stadium City has been a unique experience in addressing the form of that future.

Appendix: Design Background Research

By Alfred Ledgin

Literature Review

Introduction

This literature review comprises the first major step in the background research for Stadium City. This section investigates writings on a variety of topics, including transit-oriented development (TOD), sustainable building design, the Truman Sports Complex in Kansas City, Missouri, and urban districts and amenities related to sports stadiums. Literature on the topic of transit-oriented development includes general sets of principles as well reports of specific examples. The TOD concept is a significant branch of New Urbanist design theory, and New Urbanist literature is often a reliable source of information on the topic. Please see Table A.1 for a summary of the literature, as well as Figure A.1 for a map of the literature reviewed by both Kevin and me.

Transit-Oriented Development

Peter Calthorpe, one of the leading figures of the New Urbanist movement, has written several books which address TOD. One of the most notable is *The Next American Metropolis: Ecology, Community, and the American Dream*. Calthorpe (1993) defines TOD in clear and specific terms, introducing the concept as follows: “. . . moderate and high-density housing, along with complementary public uses, jobs, retail and services, are concentrated in mixed-use developments at strategic points along the regional transit system” (41). TOD differs from other forms of New Urbanist development in that it emphasizes the integration of a regional transit system with walkable, compact development.

Calthorpe (1993) argues that TOD should develop in advance of transit networks, noting, “TODs can exist without transit, but our transit systems have little chance of surviving in the low-density environment of sprawling suburbs without TODs” (42). Calthorpe

defines the spatial limit of a TOD as an average of 2,000 feet from a transit station and commercial center, which is a walking time of approximately 10 minutes for most people (56). Calthorpe also delineates between Urban TODs, which are high-intensity, high-density developments along trunk transit lines (light rail, heavy rail, or bus rapid transit), and Neighborhood TODs, which are moderate-density residential and commercial areas along feeder bus lines, usually within a 10-minute ride of a trunk transit line (57).

Calthorpe (1993) outlines a wide range of TOD design criteria, ranging from general to specific. The general criteria include the ideas that building entrances should address streets and sidewalks (65), “[p]edestrian routes should be located along or visible from all streets” (101), and bikeways should link important destinations (102). Some of the specific criteria address land use and street design. Calthorpe encourages using at least 10 percent of a TOD site for commercial, with “. . . a minimum of 10,000 [square feet] of retail space adjacent to the transit stop” (77).

He states that Neighborhood TODs require a minimum residential density of seven units per acre (with a minimum average of 10), while Urban TODs need a minimum of 12 dwelling units per acre (with a minimum average of 15) (83). Calthorpe also advises that streets within a TOD should have a design speed of 15 miles per hour (95). The intent of most of these guidelines is to encourage comfortable pedestrian access within a TOD, so that people can easily walk between a transit stop and a destination, as well as combine trips (41).

An important consideration in TOD is the proportional mixture of uses. Calthorpe (1993) suggests that, in an Urban TOD, five to 15 percent of the area should be public uses, 30 to 70 percent should be core commercial and employment, and 20 to 60 percent should be housing. In Neighborhood TODs 10 to 15 percent of the area should be public uses, 10 to 40 percent should be core commercial and employment, and 50 to 80 percent should be housing. Horizontal mixed-use is a requirement under these criteria, but

Calthorpe also encourages vertical mixture in the form of mixed-use buildings (63).

A later book by Peter Calthorpe and William Fulton (2001), *The Regional City*, outlines general arguments in favor of regional transit systems, emphasizing TOD as a strategy to maintain such systems' viability. The authors emphasize that suburban areas, when lacking density and walkability, generally fail to generate the transit ridership necessary to make such systems viable, which creates the need for TOD in suburban areas (218). The authors' definition of a Regional City is central to many of the points in the book. Calthorpe and Fulton state:

“[w]e believe that the Regional City cannot be conceptualized in the traditional terms of city and suburb or even as a collection of political jurisdictions. Rather, the Regional City must be viewed as a cohesive unit—economically, ecologically, and socially—made up of coherent neighborhoods and communities, all

of which play a vital role in creating the metropolitan region as a whole” (10).

The Regional City also focuses on specific case studies. Calthorpe and Fulton (2001) examine the metropolitan regions of Portland, Salt Lake City, and Seattle, which “. . . have undertaken metropolitan planning or visioning efforts that fully embrace Regional-City concepts” (105), as well as New York, Chicago, and San Francisco—larger metropolitan regions “. . . that have struggled with how to address regional problems at an enormous scale” (105). The authors also examine planning at the state level, citing the examples of Florida, Maryland, and Minnesota, which have used state legislation to address metropolitan-scale issues (105).

The article “How to Make Transit-Oriented Development Work,” from the magazine *Planning*, offers concrete principles for TOD in general terms. The article emphasizes Robert Cervero's “. . . 3Ds, or three dimensions . . .” for TOD: “. . . density, design,

and diversity . . .” (Tumlin, Millard-Ball, Zucker, and Siegman 2003). Density is fundamental to the interaction between transportation and land use, and it is an essential component of the transportation policy of San Francisco's Bay Area Rapid Transit (BART). An area's density has a strong relationship with the transit ridership generated in that area. Study of U.S. transit has shown, “. . . a 10 percent increase in population density . . .” corresponds to “. . . a five percent increase in boardings, while doubling density can reduce vehicle travel by 20 percent . . .” (Tumlin et al. 2003). In addition vehicle ownership declines to an average of one car per household as density reaches between 20 and 30 dwelling units per acre (Tumlin et al. 2003).

Perhaps equally important, diversity—mixture of land uses—also corresponds to high ridership gains. Mixed-use development can reduce vehicle trips by allowing residents to walk to amenities and allowing employees who take transit to work to access needs without a car during the day. Another important component of TOD planning is transportation-

demand management (TDM), which involves parking management. Transit agencies have often offered free parking at stations for riders, but free parking is also an incentive to drive. Research by Donald Shoup has shown that eliminating parking subsidies can reduce vehicle trips by 25 percent on average. Reducing parking also allows smaller block sizes, which encourages walking. Smaller blocks and a revision of the traditional street hierarchy are part of the design component of successful TOD (Tumlin et al. 2003).

The San Diego metropolitan area presents an interesting case study for transit-oriented development, partly because the region has the oldest current-generation light rail system in the United States, dating back to 1981 (Boarnet and Compin 1999, 80-82). The article “Transit-Oriented Development in San Diego County: The Incremental Implementation of a Planning Idea” explores the success and challenges of TOD in the region. Marlon Boarnet and Nicholas Compin caution that TOD research has had some limitations. For instance a study by Robert Cervero

found that many rail commuters living in TODs used rail transit prior to living in the TOD, meaning that personal preference of mode choice may affect housing location choice, rather than housing location simply affecting mode choice. The authors acknowledge that TOD encourages transit ridership, but information to predict ridership increase or automobile use reduction is insufficient (81).

The San Diego region is also noteworthy for light rail and TOD because the City of San Diego's land use plan incorporates TOD principles, and the Metropolitan Transit Development Board of San Diego County is one of the U.S.'s more successful light rail transit authorities (Boarnet and Compin 1999, 82). Although many San Diego Trolley (light rail) station areas have residential land uses, a necessary component of TOD, only eight have more than 20 percent of their land dedicated to residential densities of at least 15 units per acre, Peter Calthorpe's guideline for an Urban TOD (83). In contrast to the City of San Diego, the City of La Mesa, also in San Diego County, has TOD projects

at each of its four stations, but their development was generally for the purpose of goals unrelated to transit (86-89).

In other parts of San Diego County, existing land use near rail stations, difficulty in land assembly, lack of private market feasibility, local fiscal constraints, and lack of information in certain localities all served as barriers to TOD implementation (Boarnet and Compin, 1999, 90). Five cities in San Diego County served by the rail system have no TOD, but no municipality in the county is specifically opposed to rail transit or regional transit goals (92). The authors find that TOD implementation is an incremental process, which probably holds true in most regions, since barriers to TOD transcend the San Diego region (92). However, an element of successful TOD implementation is consistency between TOD and local development goals (93).

Robert Cervero and Cathleen Sullivan (2011) discuss the idea of "Green TODs," which merge green urbanism principles with transit-oriented

development. The authors list the main features of both concepts, showing that TOD includes trunk and distribution transit design, bicycle and pedestrian access, minimal parking, and compact development with a mixture of uses. The authors describe green urbanism as including renewable energy for self-sufficiency, waste recycling and water reuse, open space and community gardens, and buildings with green roofs, optimal orientation, energy-efficient construction, and low-impact materials (211). Cervero and Sullivan find that TOD and green urbanism can create synergies that result in higher densities, mixture of land use, reduction of impervious surfaces and surface-level parking, and solar energy production at transit stations (210-211).

The authors cite examples of green TODs in Sweden, Germany, and Australia. Hammarby Sjöstad is a transit-oriented brownfield redevelopment in Stockholm, Sweden with 20,000 residents. The development has seen substantial benefits from district heating and cooling, it incorporates an extensive

recycling program, and the environmental footprint of its residents is one-third lower than that of people living in Stockholm's suburbs (Cervero and Sullivan 2011, 212-214). Rieselfeld and Vauban in Freiburg, Germany have been innovators in green urbanism and have high rates of bicycle and public transit use (214-216). Kogarah Town Square in Sydney, Australia is a transit-oriented, mixed-use development that incorporates photovoltaic panels and solar building orientation and has expansive open space around a town center (216). Green TODs are significant because they can reduce a development's environmental footprint by 30 percent when compared with conventional development (217), and the combination of the two concepts can reduce a project's environmental impact more than each concept can individually (210).

Orenco Station is New Urbanist development, intended as a TOD, in Hillsboro, Oregon, 15 miles west of Portland. The development has received high acclaim, including the 1998 Community of the Year

Award from the National Association of Homebuilders (Bae 2002, 13), but an examination by Chang-Hee Christine Bae reveals design and transportation issues that raise the question of whether Orenco Station is successful as a TOD. The Orenco Station MAX light rail stop opened in 1998, and the announcement of the light rail service prompted the commercial and industrial developer PacWest to develop the 206-acre site for the mixed-use community (10-11).

Approximately 60 percent of the site is residential, with a near-equal division between single-family and multi-family structures, while approximately 25 percent is for retail, and 8.5 percent is industrial (11-12). The single-family homes have a density of 6.6 units per acre, and the multi-family homes have a density of 22.6 units per acre, both higher than the Portland area average of 4.8 (12). These characteristics fully meet Peter Calthorpe's criteria for a Neighborhood TOD but only partially for an Urban TOD.

Other characteristics are more problematic, however. Some of Orenco Station's housing is up to one mile away from the MAX station, an arterial road bisects the development, and no bicycle paths are present. In addition a substantial part of the site closest to the station remains undeveloped (Bae 2002, 12). The MAX commute to Downtown Portland takes 45 minutes (13), while U.S. Highway 26, a freeway, is only 2.2 miles from the Orenco Station Town Center, and commuting to Downtown Portland by car takes approximately 24 minutes under normal conditions (Google 2011). A survey of 200 Orenco Station households found that 75 percent of respondents always drive, while “. . . only one out of six use transit (including bus) more than twice a week” (Bae 2002, 13). In addition housing prices in Orenco Station are comparable to those in the “. . . very upscale 23rd Avenue District in Central Portland” (12), suggesting a lack of affordability for many potential residents. Bae reasons that Orenco Station has attracted residents “. . . more because of its upscale character, design characteristics and open space rather than because of its transit access” (13).

Table A.1. *List of works by topic.*

Work	Type of Work	Topic(s)	Sub-Topic(s)
Calthorpe (1994)	Book	TOD	New Urbanism, Public Transit, Regional Planning
Boarnet and Compin (1999)	Journal Article	TOD	Case Study, Public Transit, Land Use, Regional Planning
Calthorpe and Fulton (2001)	Book	TOD	New Urbanism, Public Transit, Regional Planning
Bae (2002)	Journal Article	TOD	Case Study, New Urbanism, Public Transit
Tumlin et al. (2003)	Magazine Article	TOD	Public Transit, Land Use, Transportation-Demand Management
Cervero and Sullivan (2011)	Journal Article	TOD	Green Urbanism, Public Transit
Lewis (1977)	Book	Stadium Districts, Architecture	Specific Project, Site Location, Land Use, Stadium Types
Stern (1994)	Magazine Article	Stadium Districts	Specific Project, Land Use, Public Transit
Skelley and Alexander (2004)	Magazine Article	Stadium Districts	Specific Project, Land Use, Public Transit
Graber (2010)	Thesis	Stadium Districts	Green Urbanism, Stormwater Management, Parking Lots
HNTB (1980)	Journal Excerpt	Architecture, Stadium Districts	Building Design
McKenzie (1997)	Book	Architecture, Stadium Districts	Building Design, Cultural Significance
Harvey (2006)	Book	Architecture	Building Design, Energy-Efficiency, Environmental Impact

Stadium Districts

The construction of Petco Park, a new ballpark for the San Diego Padres baseball team, spurred an increase in downtown development to complement the field. Jack Skelley and Jill Alexander (2004) describe this development, stating, “[t]he new facility is the centerpiece of an attempt to create a walkable, 24-hour city with multiple residential developments; corridors of urban entertainment uses, especially restaurants and nightclubs; and public transportation” (105). The Ballpark District constitutes a major share of Downtown San Diego’s development. The district is a 26-block redevelopment project, “. . . estimated to be the biggest single urban redevelopment effort in U.S. history,” and it includes offices, retail, a hotel, and residential development (105).

The Ballpark District is on the former site of the East Village warehouse district, most of whose buildings underwent demolition, although historic preservation efforts secured the reuse of several single-story produce

warehouses (Skelley and Alexander 2004, 105-112). The efforts to create a walkable, transit-oriented district around a professional sports stadium appear successful by some measures. People who visit the district for baseball games often “. . . arrive early or stay late to patronize restaurants in the Gaslamp District” (112), adjacent to the Ballpark District. In addition the district’s convenient access to the San Diego Trolley seems to play a role in the area’s transportation use, since Petco Park appears to have generated significant ridership (112). Another noteworthy aspect of the Ballpark District is that its planners opted not to create a specifically sports-themed district and instead “. . . wanted to create a real city and a real place” (quoted in Skelley and Alexander 2004, 110).

A different approach has guided the planning for expansion of the Meadowlands sports complex in East Rutherford, New Jersey. The New Jersey Sports and Exposition Authority launched a plan to create a “. . . sports-themed business and entertainment center and a regional transportation hub” (Stern 1994, 11) at the

suburban sports complex. Hellmuth, Obata, & Kassabaum (HOK) prepared the master plan, which outlines a total of “. . . 1.4 million square feet of new space, including a passenger rail station, a 600-room hotel, 100,000 square feet of office space, and sports-themed retail and entertainment facilities that will anchor the Meadowlands' existing facilities” (11). The plan for the central structures includes “. . . flagship sports apparel and equipment outlets and superstores, . . . a 40,000-square-foot, high-tech entertainment center; a food court; a 60,000-square-foot conference center; and a 20,000-square-foot television studio and communications center” (11).

An important feature of the sports complex plan is an elevated passenger rail station, which will extend New Jersey Transit rail lines and will have a capacity of 20,000 passengers per hour (Stern 1994, 12). Integrating transit with the development constitutes a significant attempt to bring a multi-purpose, transit-oriented center to a suburban sports complex, although the plan lacks residential land uses and differs from

New Urbanist TODs in fundamental aspects. The large entertainment and retail complex, currently named American Dream Meadowlands, is only 80 percent complete today, and it is still undergoing changes in design and program (American Dream 2011).

The design, uses, and location of the site of the Truman Sports Complex in Kansas City, Missouri involved several complex decisions. The design of the Truman Sports Complex addressed the question of Kansas City's image. In the book *The Harry S. Truman Sports Complex: Rocky Road to the Big Leagues*, Robert W. Lewis (1977) describes Kansas City's question of identity in relation to its major league sports complex, stating, “[o]f all the reasons for needing a Complex, the need for “big league” identification was over-riding; whatever was built, it must be big league. Like many midwestern cities, Kansas City was saddled with a frontier image” (4). Lewis adds, “[a] plain, functional facility that could accommodate major league sports might have been acceptable to buffs interested in sports for its own sake, but such a facility would have little

value to politicians or to prospective team owners, and it would merely reinforce the cowtown image the City was trying to avoid” (4).

The developers of the Truman Sports Complex considered a downtown site, but the expense of redevelopment and potential traffic problems made the site at Interstates 70 and 435, known as the Leeds site, a more attractive alternative (Lewis 1977, 24). The developers also considered a domed, multi-purpose stadium, which would have been easier to locate downtown, to be an undesirable option. According to Lewis, “[the] reasoning included excessive operating costs . . . and the lack of a prime tenant” (24). Furthermore, Lamar Hunt actively pursued the idea of a stadium exclusively for football, offering to invest millions of dollars and sign a 35-year lease (24).

One unfulfilled option for the site was to include an entertainment center, as proposed by Lamar Hunt and Jack Steadman in 1967, which would have included “. . . a space needle restaurant, a roadway for jet powered racers, and a Disneyland type amusement park on

adjacent excess park land that was yet to be acquired” (68). Hunt proposed reserving 77 acres for the entertainment center; however Ewing Kauffman, owner of the Kansas City Royals, expressed concern “. . . that Hunt's proposed theme park would draw customers away from Royals games during the summer baseball season,” so Hunt withdrew the proposal, also citing land acquisition and parking problems (68).

Jay Graber's thesis *The Green Tailgate: Alternative Approach to Stormwater Management at Sports Venues* offers design solutions to enhance the environmental sustainability of large, ground-level parking lots at sports stadiums. Graber (2010) states, “[u]sing Low Impact Development (LID) to manage stormwater with the use of natural systems, rather than the typical end of pipe methods, is a way to create the 'Green Tailgate’” (3). In envisioning a “green tailgate,” Graber proposes that enhancing a sports stadium's parking lot, as well as the tailgating experience that occurs on the parking lot, may be a way to increase revenue for the sports enterprise (2).

The intent of Graber's methods is to “. . . reduce the pollutant loads created by stormwater runoff while creating amenities for spectators that could potentially generate revenue” (Graber 2010, 3). Graber offers a specific design solution for the Truman Sports Complex. The goals of this solution are to recharge the area's watershed, improve the area's water quality, improve the comfort of spectators at the site, and provide amenities on the site (125). Graber's design addresses two specific parking lots on the site and introduces vegetated swales and stormwater retention areas that run parallel to parking aisles. These green areas are each ten feet wide and provide ground permeability for stormwater while providing space that sporting event spectators can use for tailgating (132)

Architecture

The architecture of sports stadiums, as well as sustainability goals, can have an influence on the design of surrounding buildings and land uses. Describing the importance of Arrowhead Stadium,

project architect Ron Labinski noted, “[a]fter Arrowhead you saw stadium design going in a totally new direction” (quoted in McKenzie 1997, 23). The two stadiums of the Truman Sports Complex, designed by architecture firm Kivett and Myers, are influential buildings and landmarks of the Kansas City region.

One of the developing concepts for the Truman Sports Complex proposed an additional layer of complexity. Architect Charles Deaton, teaming with Kivett and Myers, designed a rolling roof that would slide across the two stadiums as needed. However, this would have added between 3.5 and 18.5 million dollars to the total cost of the project, an expense deemed unnecessary, although it was essentially a bargain when compared with the cost of domed stadiums, which became increasingly popular after the construction of Arrowhead and Kauffman Stadiums (McKenzie 1997, 28-29).

HNTB (1980) discusses some of the specific design solutions for the two stadiums. The architectural forms create a curvilinear, bowl-like effect, “. . . with

one high point at each corner of the football facility and two end points on the baseball stadium” (54). Reinforced concrete became the dominant material because the curvilinear sculptural forms required a plastic structural material (54). The design of the main support columns in both stadiums consists of curved, sculptural lines. Curves are prevalent throughout the stadiums, since “[a]ll levels have an elliptical cross section, creating smaller risers at the front than at the back” (55). Symmetry is also an important feature, as Kauffman Stadium is symmetrical around one axis, and Arrowhead Stadium is symmetrical around two axes (55).

A Handbook on Low-Energy Buildings and District-Energy Systems by L. D. Danny Harvey (2006) describes several specific design solutions to increase energy-efficiency and environmental sustainability in both individual buildings and in large developments. The book introduces six principles of sustainability, the first four of which originate in the *HOK Guidebook to Sustainable Design*. One can summarize the principles

as follows: human-made materials and Earth crust substances “. . . must not systematically increase in the ecosphere . . .,” building systems must not reduce natural diversity and productivity, the use of resources for human needs must be fair and efficient, renewable energy must meet human needs without diminishing long-term natural capacity, and freshwater consumption must not exceed the rate at which the hydrological cycle supplies freshwater (14-15).

An important consideration for a large development project is the shape, form, and orientation of buildings. All of these design decisions affect “. . . heating and cooling loads, daylighting and the opportunities for passive ventilation, passive solar heating and cooling, and for active solar energy systems” (Harvey 2006, 110). Shape, form, and orientation are more important for smaller buildings and those with less insulation; however, these choices can help minimize energy requirements in practically all buildings (110). An important consideration in building form is the surface-to-volume ratio, which, if minimized, can “. . .

reduce the heating load for a given insulation system,” although other factors, such as insulation, window performance, and “. . . a more air-tight envelope and the use of heat exchangers to recover heat from exhaust air in a mechanical ventilation system” may play a more important role (110-111). In addition building shape and orientation affect “. . . opportunities for passive solar heating . . . and for passive ventilation and cooling” (112). The *Handbook* offers several detailed strategies for energy-efficiency, which involve the siting and design of buildings, either individually or in groups.

Conclusions

Extensive literature exists on the topic of transit-oriented development. All of this literature is relevant to the design of a TOD at the Truman Sports Complex. However, literature on the specific topic of urban districts surrounding sports stadiums (stadium districts) is less common. Sports stadiums have a variety of location patterns; some, such as Fenway Park

in Boston and Wrigley Field in Chicago, are in dense, urban, mixed-use areas, while others, such as the Meadowlands sports complex in New Jersey and the Truman Sports Complex in Kansas City, are in low-density suburban areas, adjacent to or surrounded by, large areas of ground-level parking. The topic of architecture has a special relevancy to the Truman Sports Complex TOD concept because sports stadiums are often landmark buildings, and new neighborhood buildings could capitalize on the distinctive styles of the sports stadiums. In addition environmentally conscious and energy-efficient building and site design is always a relevant concern to any large development project.

Glossary

The following is a list of terms that are central to this research.

Green Urbanism: “Green urbanism reduces energy use, emissions, water pollution and waste from a stationary source standpoint in the form of green architecture and sustainable community designs With green urbanism, pocket parks and community gardens replace surface parking” (Cervero and Sullivan 2011, 210).

Mixed-Use: 1. A “. . . [neighborhood] of housing, parks, and schools placed within walking distance of shops, civic centers, [and] jobs . . .” (Calthorpe 1994, 16).

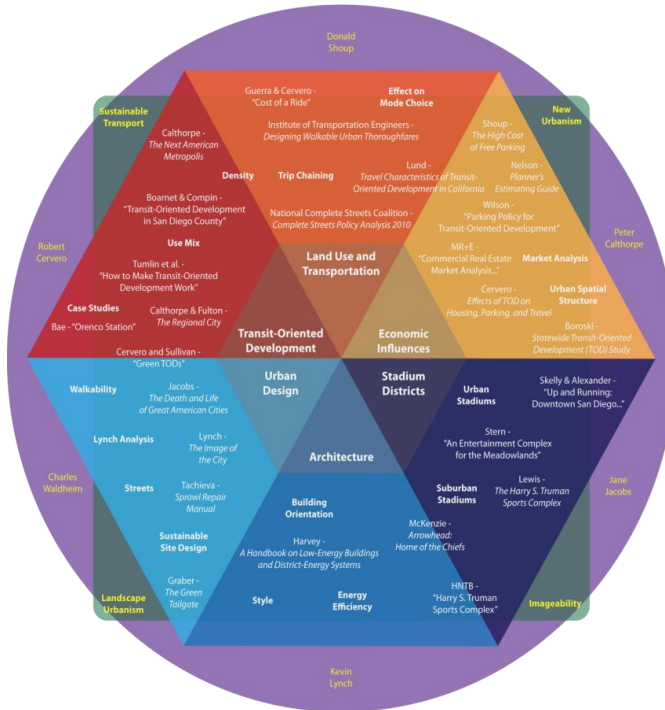
2. “The inter-mixing of housing, shops, restaurants, workplaces, libraries, day-care centres and other activities . . .” (Cervero and Sullivan 2011, 211).

New Urbanism: An urban design movement that “stand[s] for the restoration of existing urban centers and towns within coherent metropolitan regions, the reconfiguration of sprawling suburbs into communities of real neighborhoods and diverse districts, the conservation of natural environments, and the preservation of our built legacy,” and which has set “. . . principles to guide public policy, development practice, urban planning, and design . . .” (quoted Calthorpe and Fulton 2001, 282).

Transit-Oriented Development (TOD): “A Transit-Oriented Development (TOD) is a mixed-use community within an average 2,000-foot walking distance of a transit stop and core commercial area. TODs mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot, or car” (Calthorpe 1994, 56).

Kevin Credit
Alfred Ledgin
Literature Map

Figure A.1. Literature map.



Topics Sub-Topics Works Philosophies People

Precedent Studies

Introduction

These precedent studies comprise another essential step in Stadium City's background research. The development examples listed here both inspired our plan and helped provide a background of practical principles to consider in our decisions. These precedents come from a range of contexts across the U.S., developed at various points in history.

Cities have often planned professional sports stadiums in isolation, sometimes simply locating them in the middle of a large parking surface, sometimes even setting that context in the middle of a large greenfield. However, many cities, partly in conjunction with the trend of replacing older stadiums, are encouraging new development adjacent to their stadiums, creating the potential for synergies between differing land uses, and activating environments that may become walkable and diverse. The creation and

expansion of public transit systems, many of which have recently begun to provide service to stadiums, will likely improve the viability of stadium-associated urban centers. The Truman Sports Complex in Kansas City, Missouri is relatively unique because it features two adjacent stadiums, something frequently found in cities' downtowns, but it is in a low-density, suburban setting. The precedents listed below provide a range of ideas for how the Truman Sports Complex might develop, although all of their contexts are distinct from that of Kansas City's stadiums.

Fenway-Kenmore Neighborhood, Boston, Massachusetts

Fenway-Kenmore is a neighborhood on the western side of the city of Boston, Massachusetts, perhaps best known for being the home of Fenway Park, the stadium of the Boston Red Sox professional baseball team. Surrounding Fenway-Kenmore are the Charles River to the north, the Back Bay neighborhood to the east, the Roxbury neighborhood to the southeast, the Mission

Hill neighborhood to the south, the city of Brookline to the southwest, and the Allston neighborhood to the northwest. The history of the neighborhood as an established portion of Boston dates back to 1875, the formation of the Boston Parks Commission. The Parks Commission implemented Frederick Law Olmsted's plan for the Emerald Necklace park system, which includes the Back Bay Fens, a prominent park that defines the center of the Fenway-Kenmore neighborhood. The Back Bay Fens park, located directly south of the Charles River, incorporates the the Muddy River and Stony Brook, tributaries of the Charles River (City of Boston 2011).

Fenway Park is likely the best known landmark in the Fenway-Kenmore neighborhood. The Cleveland architectural firm Osborn Engineering designed Fenway Park, which opened on April 9, 1912. It is the oldest stadium in professional baseball, and in addition to the Red Sox, its tenants have also included the Boston Braves baseball team, the Boston Redskins, Shamrocks, Bears, Yanks, and Patriots football teams,

and the Boston Beacons soccer team. The stadium has a seating capacity of 33,925, and in 1934 it underwent a major renovation, partly necessitated by a fire that destroyed part of the building (Foulds 2005, 46-51). Despite proposals to replace the historic stadium, the Boston Red Sox recently committed 285 million dollars in renovations to the stadium, which now has a projected 40 to 50 years of useful lifespan remaining (Abraham 2011).



Figure A.2. *Fenway Park.*

The Fenway-Kenmore neighborhood is a mixed-use neighborhood by definition. It includes residences;

commercial uses such as restaurants, bars, and entertainment venues; higher education institutions; and cultural institutions such as the Museum of Fine Arts and Symphony Hall (City of Boston 2011). Many of the structures, themselves, are mixed-use buildings with commercial uses on the ground floor. The presence of the Emerald Necklace park system also provides the neighborhood recreation and open space. An analysis using Kevin Lynch's terminology from *The Image of the City* (edges, paths, landmarks, districts, and nodes) (1960) shows that Beacon Street, Brookline Avenue, Boylston Street, Charlesgate, Commonwealth Avenue, Fenway, Massachusetts Avenue, and Park Drive constitute some of this district's major paths. The Charles River is the most prominent edge in the district. Interstate 90/The Massachusetts Turnpike and the Amtrak and Massachusetts Bay Transportation Authority (MBTA) Commuter rail lines form a secondary edge, although several pedestrian and vehicular crossings are available. Kenmore Square is a major node in the district, and the transit stops on the MBTA Commuter Rail line and the D Branch of the

Green Line Subway—two trunk transit lines—also function as nodes.

In addition to Fenway Park, several historic structures and features create landmarks in the Fenway-Kenmore neighborhood. One of the most prominent is the Sears Building, located at the intersection of Brookline Avenue and Park Drive and built in 1928. Designed in the Art-Moderne style, this building opened as a Sears Roebuck and Company retail store and mail order facility, and it is now an official Boston Landmark, protected from changes that would diminish its historic character (City of Boston 2011). Another prominent visual landmark is a large Citgo sign, which sits atop a building facing Kenmore Square. Citgo erected the sign in 1965 and planned to dismantle it in the early 1980s, but citizens demanded its protection, and Citgo refurbished the sign in 1983 in response (Daniloff 2009).



Figure A.3. *Citgo Boston.*



Figure A.4. *The Landmark Center.*

In terms of transit accessibility, three rail transit stations are central to the Fenway-Kenmore neighborhood: Fenway and Kenmore Stations, serving the D Branch of the MBTA Green Line Subway, and Yawkey Station, serving MBTA Commuter Rail. A GIS analysis of a 2,000-foot buffer around these three stations shows that the Census Blocks within this buffer have an average density of approximately 24 dwelling units per acre (U.S. Census Bureau 2010). This demonstrates how the neighborhood functions as transit-oriented development (TOD), since TOD expert Peter Calthorpe advises that a TOD is within a 2,000-foot radius of a transit stop and, when serving a major transit station, has a minimum average density of 15 dwelling units per acre (Calthorpe 1993). The GIS analysis also shows that the Census Blocks within the buffer have a total population of 21,765 (U.S. Census Bureau 2010), the size of a small city or multiple neighborhood units. However, the area contained within this buffer extends beyond the boundary of the Fenway-Kenmore neighborhood and into the city of Brookline.

The Fenway-Kenmore neighborhood is highly relevant to the Truman Sports Complex Transit-Oriented Development project. The goal for the Truman Sports Complex TOD is to create a dense, mixed-use district adjacent to Arrowhead and Kauffman Stadiums in Kansas City, Missouri, while centering this district around a stop on a new rail transit line. The project essentially aims to build an area with urban vitality next to the two professional sports venues. Although the goal of the project is not necessarily to emulate an existing urban district from another city, the Fenway-Kenmore neighborhood is one of the most significant examples of a transit-oriented and pedestrian-friendly urban district surrounding a professional sports stadium. The Fenway-Kenmore neighborhood established dense, mixed-use development within a short walking distance from multiple transit stations long before urbanists employed the term “transit-oriented development.” Although the Fenway-Kenmore neighborhood is urban in its spatial form, in contrast to the Truman Sports Complex's suburban context, the

district provides inspiration for many of the types of accessibility and land uses that would make a mixed-use district at the Truman Sports Complex function as a TOD and as a regional center. Please see Figures A.2 through A.4 for photographs from Fenway-Kenmore, as well as Figures A.5 through A.8 for maps of the neighborhood.

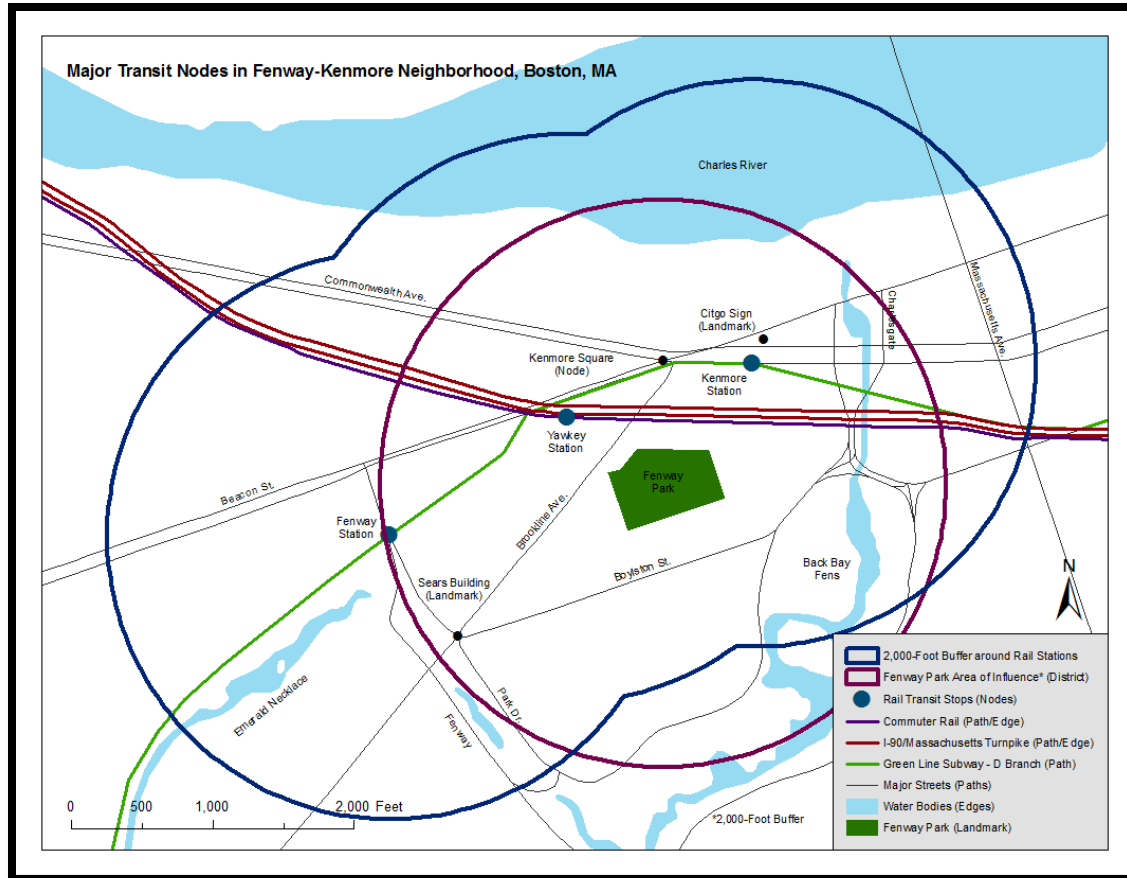


Figure A.5. Major Transit Nodes in Fenway-Kenmore Neighborhood.

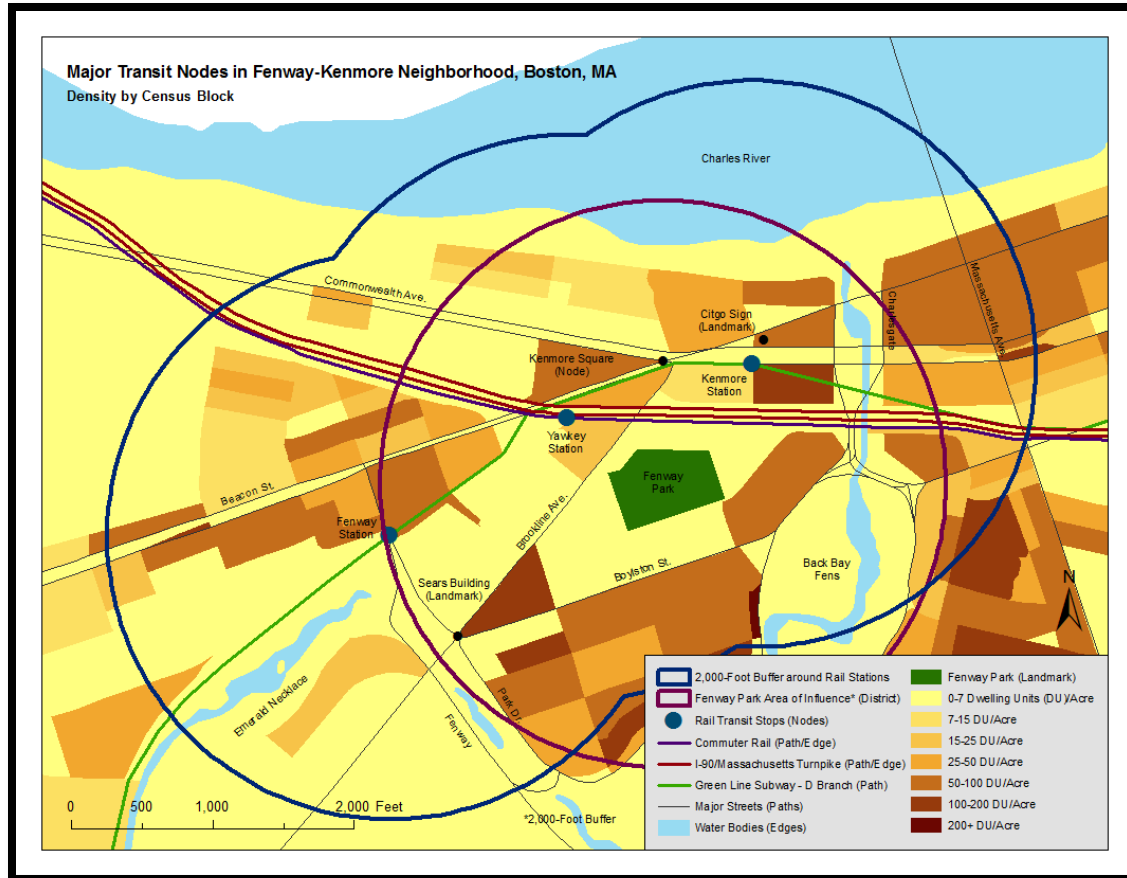


Figure A.6. Major Transit Nodes in Fenway-Kenmore Neighborhood: Density by Census Block.

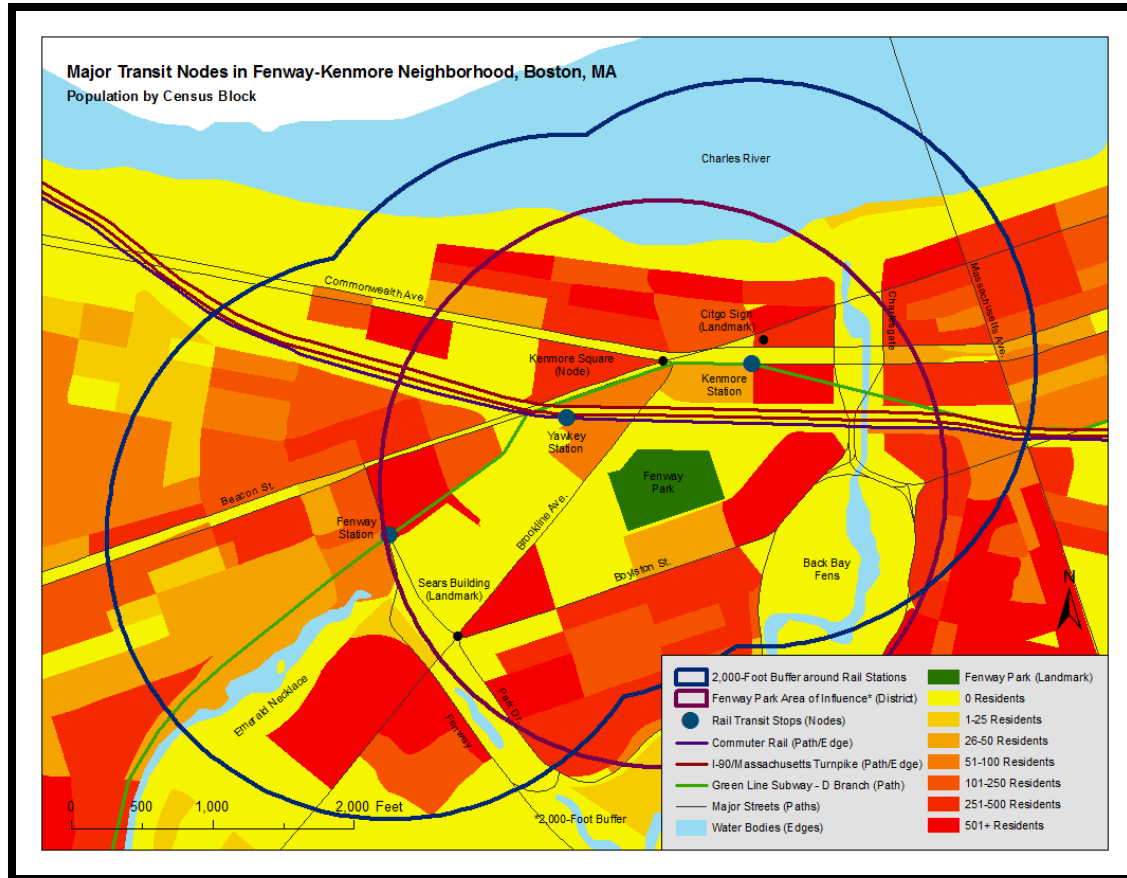


Figure A.7. Major Transit Nodes in Fenway-Kenmore Neighborhood: Population by Census Block.

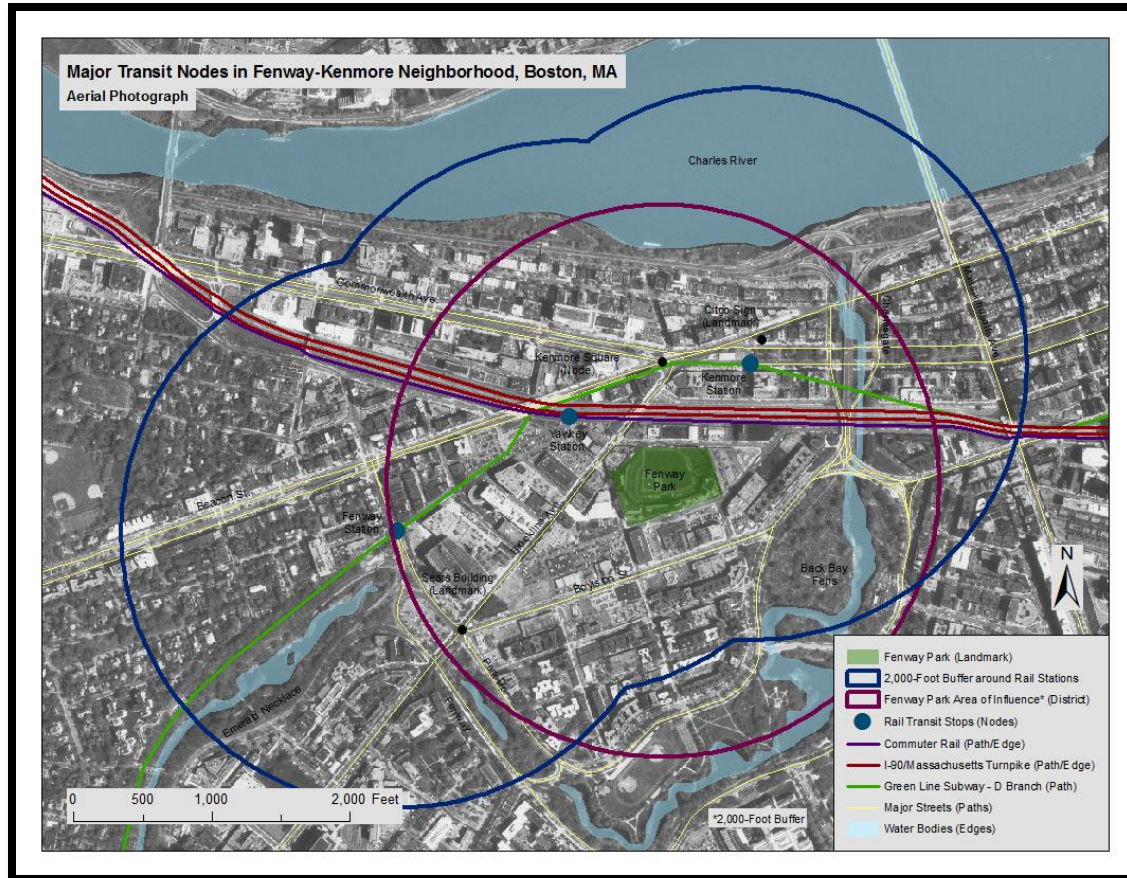


Figure A.8. Major Transit Nodes in Fenway-Kenmore Neighborhood: Aerial Photograph.

The Banks, Cincinnati, Ohio

The Banks is a large redevelopment project on the south side of downtown Cincinnati, Ohio, named for its location on the banks of the Ohio River. It follows the construction of Paul Brown Stadium and the Great American Ball Park—two new venues for the Cincinnati Reds and Bengals baseball and football teams, to replace the multi-purpose Cingery Field. The location of the Banks project is between the two new stadiums and south of Interstate 71. The project includes mixed-use development adjacent to a riverfront park. Upon the completion of the Cincinnati Streetcar system, the Banks will become a transit-oriented development, serving the southern terminus of the streetcar line. The Dawson Company and USAA Real Estate Company are the developers of the project (The Banks 2011).

Downtown Cincinnati currently has several office and commercial uses, but it has a low overall residential density. Currently, the average residential density

within 2,000 feet of the end of the planned Cincinnati Streetcar line, where a station serving the Banks would be located, is approximately five dwelling units per acre (U.S. Census Bureau 2010), which is low for an urban setting or a transit-oriented development. However, upon completion, the Banks will change these characteristics substantially. The total land area of the mixed-use development is 18 acres, and construction is occurring in two phases. Phase One is currently under construction, with some restaurants already open and some apartments already available for rent. Upon Phase One's completion, the Banks will include 300 dwelling units, which will give the development a residential density of approximately 17 dwelling units per acre (The Banks 2011), meeting Peter Calthorpe's density requirement for an urban TOD (Calthorpe 1993). In addition Phase One will include 80,000 square feet of retail and 3,300 parking spaces. The next phase will incorporate a large office building, with 250,000 square feet of office space and three parking spaces for every 1,000 square feet, which is higher than the current downtown parking ratio (The Banks 2011).

The total planned floor area of the Banks is approximately 3,000,000 square feet, including around 1,000,000 square feet of office space (The Banks 2011). This results in 36 percent of the development's floor area being commercial and employment space, which meets Peter Calthorpe's requirement of an urban TOD consisting of 30 to 70 percent commercial and employment space (Calthorpe 1993). The total number of planned residential units is 1,500 apartments and condominium units, giving the Banks a density of 84 dwelling units per acre upon final completion. The development will also include a 200-room hotel. Adjacent to the Banks is the National Underground Railroad Freedom Center and the under-construction, 45-acre Riverfront Park, providing a large land area of public uses within the development's area of influence (The Banks 2011). The entirety of the Banks development, as well as the Underground Railroad Freedom Center, Riverfront Park, the Great American Ball Park, US Bank Arena, and most of Paul Brown Stadium, are within 2,000 feet of the planned terminus of the Cincinnati Streetcar line, and thus the

Banks meets much of the basic criteria for a TOD (Calthorpe 1993). Although Interstate 71 creates an edge between the Banks and the majority of downtown, the presence of an overpass at almost every block negates the potential separating effect of the freeway.



Figure A.9. *The Banks.*

The Banks development has involved substantial investments in infrastructure. The first phase of construction, begun in 2008, involved building underground parking garages (The Banks 2011), in order to reduce the land area dedicated to parking, thus freeing more land area for residential, commercial, and office uses, as well as public space. The Banks is part of a large, comprehensive redevelopment effort that has spanned more than a decade. In 2003 it was the largest

redevelopment project underway in the United States, with the intent of converting a former industrial area in a floodplain to a functional, mixed-use urban district. The developers raised the streets to the level of the rest of downtown, above the floodplain, and the transportation departments rebuilt the downtown portion of Interstate 71, lowering it below street level. Paul Brown Stadium, designed by NBBJ and completed in 2000, is a significant part of this large-scale redevelopment. The contemporary stadium features a prominent, sculptural roof, with the intent of providing an iconic building to downtown Cincinnati (Meis and NBBJ 2003, 79).

The Cincinnati Streetcar will be an integral component of the Banks and related development. The streetcar system will be the first contemporary rail transit system in the Cincinnati metropolitan area. The first phase of construction will create a transit loop that serves Cincinnati's urban core, running from Findlay Market in the north to Government Square, downtown. The first phase will not serve the Banks

directly, although the Banks is only three blocks from the initial southern terminus at Fifth Street. However, the second phase will extend the system to the Banks, as well as provide a northern extension. The current goal for the streetcar system is to extend northward to the Cincinnati Zoo, providing a rail transit connection between the zoo and the Banks. The Southwest Ohio Regional Transit Authority (SORTA) will operate the streetcar system, running the vehicles up to 18 hours per day, seven days per week. The City of Cincinnati (2011) has not yet published a construction and opening schedule for the streetcar system, and substantial completion of the first phase of the Banks will likely occur before the Cincinnati Streetcar becomes operational. However, this may benefit the streetcar system, since a major transit-oriented development, combined with popular attractions, will already be open, positioned to serve the southern terminus of the major transit line.

The Banks is likely the project that most closely serves as a true precedent for a TOD at the Truman Sports Complex. The main difference is that the Banks is adjacent to Cincinnati's downtown, while the Truman Sports Complex is in a suburban portion of Kansas City, approximately eight miles from downtown. However, despite the difference between locations within their respective regions, the Banks and the proposed Truman Sports Complex TOD have many notable similarities, especially since both are or would be TODs by nature of their land uses and basic spatial characteristics. Both projects are in areas that have or had relatively low residential densities immediately prior to project construction. In fact the area within 2,000 feet of a probable station area at the Truman Sports Complex has a residential density of close to zero dwelling units per acre, since very few housing units currently exist within that buffer. Both projects would add several dwelling units within a 2,000-foot radius of a transit station, although building more than 1,500 housing units at the Truman Sports Complex TOD may be desirable, since the station

would likely be farther from other stations than the distance between the Banks station and downtown Cincinnati stations.

The most notable similarity is that the Banks provides a mixed-use development adjacent to two professional sports stadiums—one for baseball and one for football. Furthermore, the Banks is more than just an entertainment district such as the Kansas City Power and Light District; it provides a complete ensemble of restaurants, retail, offices, and residences. The Banks' mixture of land uses, as well as the recreational space provided in the adjacent Riverfront Park, may be a viable inspiration for the provision of land uses in the Truman Sports Complex TOD. However, an increased number of dwelling units, including some single-family houses—a land use not included in the Banks—may further achieve the goal of creating a comprehensive TOD at the sports complex. Please see Figure A.9 for a photograph of the Banks, as well as Figures A.10 through A.12 for maps of the development.

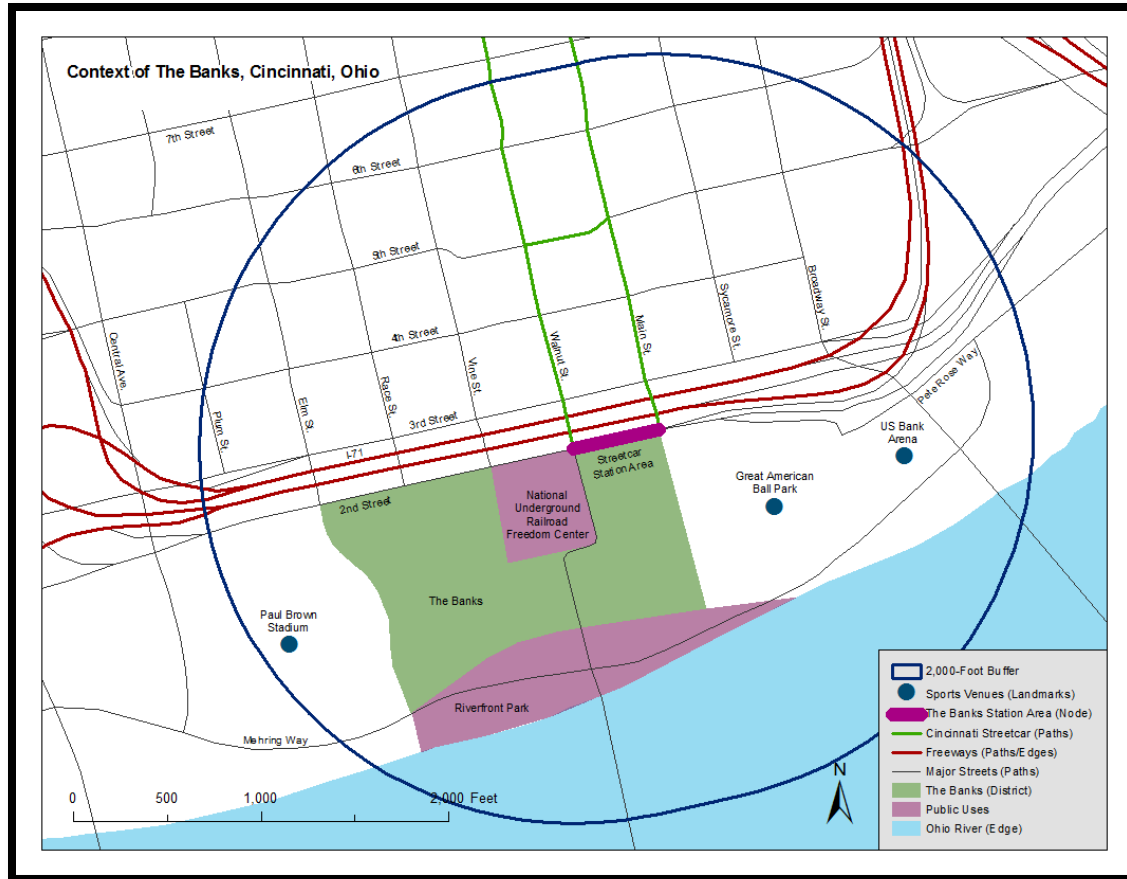


Figure A.10. *Context of The Banks.*

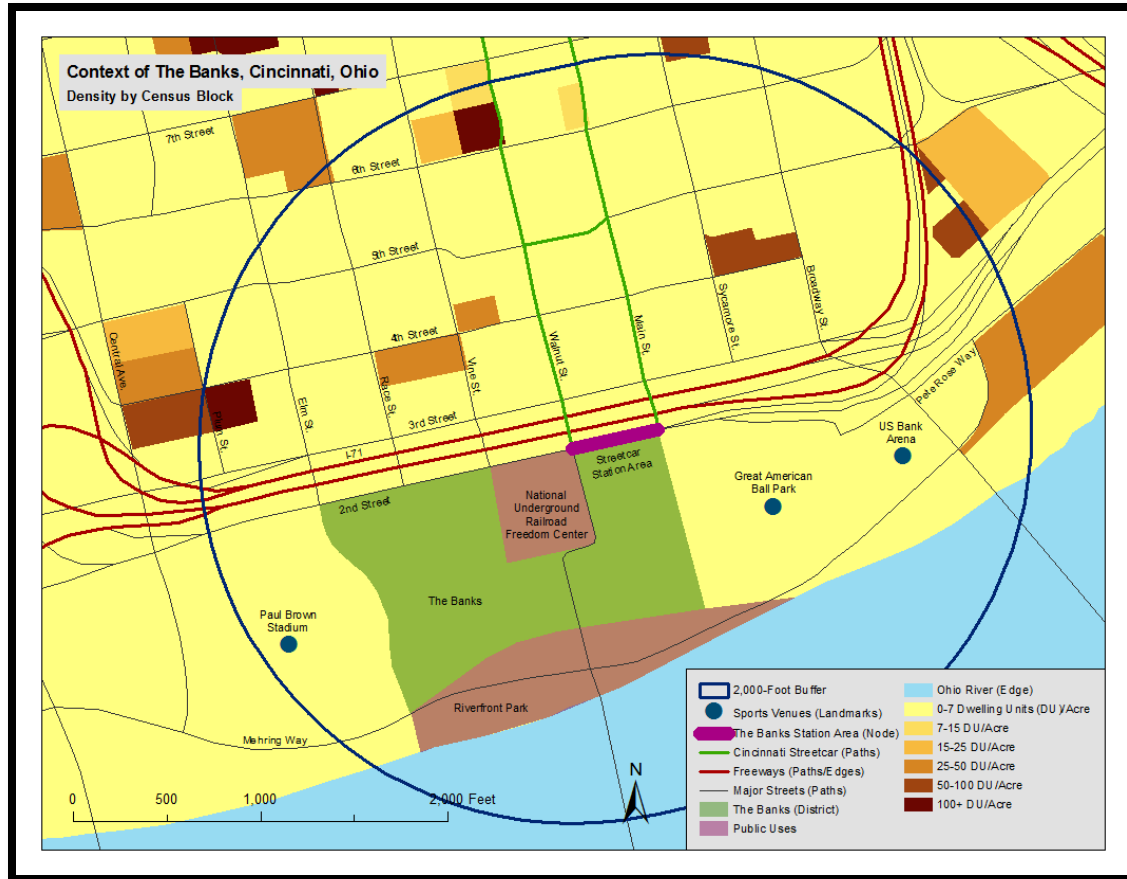


Figure A.11. Context of The Banks: Density by Census Block.

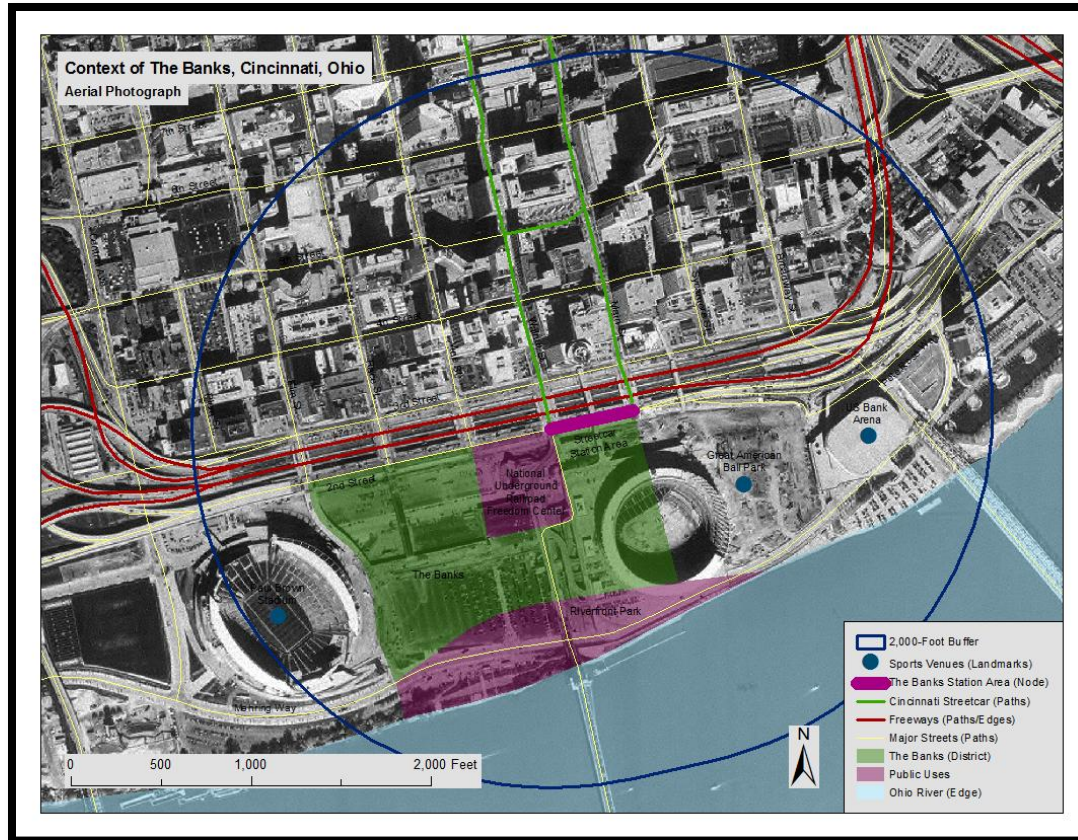


Figure A.12. Context of The Banks: Aerial Photograph.

Meadowlands Sports Complex, East Rutherford, New Jersey

The Meadowlands Sports Complex is a suburban district that clusters major sports and entertainment venues. At its center is MetLife Stadium, home to the New York Giants and Jets football teams and the replacement for Giants Stadium. The sports complex also includes the Meadowlands Racetrack, a large venue for horse racing, and the IZOD Center, an arena used for sporting events and concerts. The Meadowlands Sports Complex has long been a single-purpose sports and entertainment district, served only by automobile and bus transportation. However, two projects are changing the land use and transportation characteristics of this district.

American Dream Meadowlands, the current incarnation of a long-awaited project that previously used the names “Xanadu Meadowlands” and simply “Meadowlands,” is a proposed regional-scale retail and entertainment center, nearing completion of

construction. Triple Five, the current developer of the project, plans to open the center in the Fall of 2013. The project will have a total gross leasable area of three million square feet, including 650,000 square feet of anchor retail, one million square feet of specialty retail, 150,000 square feet of restaurants, and 1.1 million square feet of anchor attractions. The project's entertainment features include an indoor skiing facility, the first in North America; a glass-domed, indoor amusement park and water park; an indoor ice rink; a 26-screen movie theater; and a live performing arts theater. The project will also add 30,000 parking spaces to the Meadowlands Sports Complex (American Dream 2011).



Figure A.13. *Xanadu as seen from the roof of the Meadowlands Sheraton.*

Developers have proposed rail transit service to the Meadowlands Sports Complex since it opened in 1976, but the first rail transit service to the complex began operation in 2009, when the Meadowlands Station opened, connecting New Jersey Transit's Meadowlands commuter rail line to MetLife Stadium and nearby attractions. The rail transit service currently only operates for events expected to attract at least 50,000

attendees. However, New Jersey Transit plans to begin regular daily service to the station upon the opening of the American Dream Meadowlands project (Associated Press 2009).

Although the contemporary Meadowlands Sports Complex development is a transit-oriented development in the literal sense of the term, it lacks many of the features Peter Calthorpe (1993) prescribes for a successful TOD. Primarily, none of the Meadowlands projects include a residential component, and no residences currently exist within 2,000 feet of the Meadowlands Rail Station. Although the Meadowlands entertainment center originally proposed to add office space to the complex (Stern 1994), none of the current projects mention the inclusion of offices. Furthermore, except under high-growth economic conditions, the potential of the Meadowlands site as a regional-scale retail center seems questionable, considering the large and thriving Garden State Plaza is only 11 miles away in nearby Paramus. Private developers, including Triple Five,

have already invested nearly three billion dollars into the American Dreams Meadowlands project, and the State of New Jersey has even provided a 200 million-dollar subsidy (Pristin 2011), but the project has seen repeated delays since its conception.

The Meadowlands Sports Complex is relevant to the proposed Truman Sports Complex TOD because, similar to the Truman Sports Complex, the Meadowlands is in a suburban setting. The Meadowlands complex also provides a rail transit connection to other parts of the region, including New York and several New Jersey communities. However, American Dreams Meadowlands does not seem to be an appropriate model for a TOD at the Truman Sports Complex. A project that includes residences and office space, as well as retail, would likely better serve the Rock Island transit line than would a shopping center or entertainment district. The Power and Light District in downtown Kansas City already provides a large entertainment district for the region, and Independence Center is already a thriving, regional-

scale shopping center only eight miles away. The Kansas City market is drastically small in comparison to the New York region and does not likely have enough demand to support another large retail and entertainment center. Please see Figure A.13 for a photograph of American Dreams Meadowlands and Figures A.14 and A.15 for maps of the sports complex.

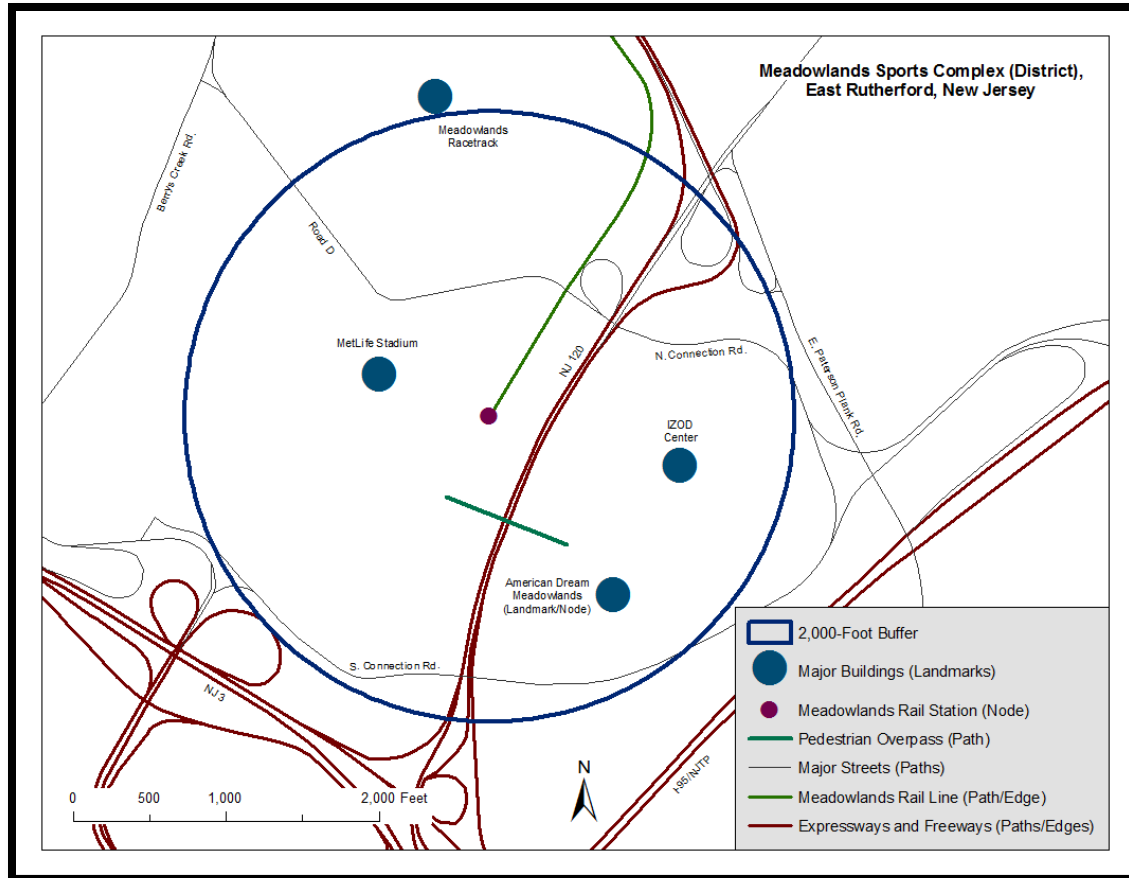


Figure A.14. *Meadowlands Sports Complex.*

Ballpark District, San Diego, California

The Ballpark District, one of San Diego's most recent large-scale development projects, has been an essential component of a surge in development and revitalization in the city's downtown over the past two decades. From the late 1990s and into the early 2000s decade, San Diego's downtown population more than doubled, growing from 20,000 to 50,000 residents. In 2004, as development of the Ballpark District was underway, 3,212 apartments, 6,253 condominium units, 589,000 square feet of retail space, 662,000 square feet of office space, and 3,538 hotel rooms were under construction (Skelley and Alexander 2004). Petco Park, the new San Diego Padres baseball stadium, and the 26-block Ballpark District, represent a large-scale example of integrating dense, mixed-use development with a professional sports venue and public transit, in this case, the San Diego Trolley.



Figure A.16. *PETCO Park.*

Gaslamp Quarter Station, serving the San Diego Trolley's Orange Line; Park and Market Station, serving the Trolley's Blue Line; and the 12th and Imperial Transit Center, which serves both lines; are all within 2,000 feet of Petco Park, placing the new stadium within walking distance of three light rail transit stops. GIS analysis shows that the 15 Census

Block Groups that lie within or are intersected by a 2,000-foot buffer around the three transit stations, have an average residential density of 15.6 dwelling units per acre (U.S. Census Bureau 2010). This density only meets Peter Calthorpe's requirement for an Urban TOD (Calthorpe 1993), but it exceeds the residential densities of some other American cities' downtowns.

San Diego's Ballpark District is relevant to the Truman Sports Complex TOD project because of its integration of a major league sports stadium with mixed-use, transit-oriented development. However, the Ballpark District is not an entirely applicable example, since it is in the center of a growing, active downtown, surrounded by other intense, high-density downtown development, including the adjacent Gaslamp District. A TOD at the Truman Sports Complex would not have the same physical connection to other intense development that the Ballpark District enjoys. Although the Truman Sports Complex may have the potential for large-scale, dense development, the project would need to function in a suburban

context, surrounded by low-density development and open space. The Truman Sports Complex's connection to downtown Kansas City and other points in the region via public transit and freeways is not the same as a walkable connection to surrounding land uses, since the necessary urban fabric is not in place. Please see Figure A.16 for a photograph of Petco Park and Figures A.17 and A.18 for maps of the Ballpark District.

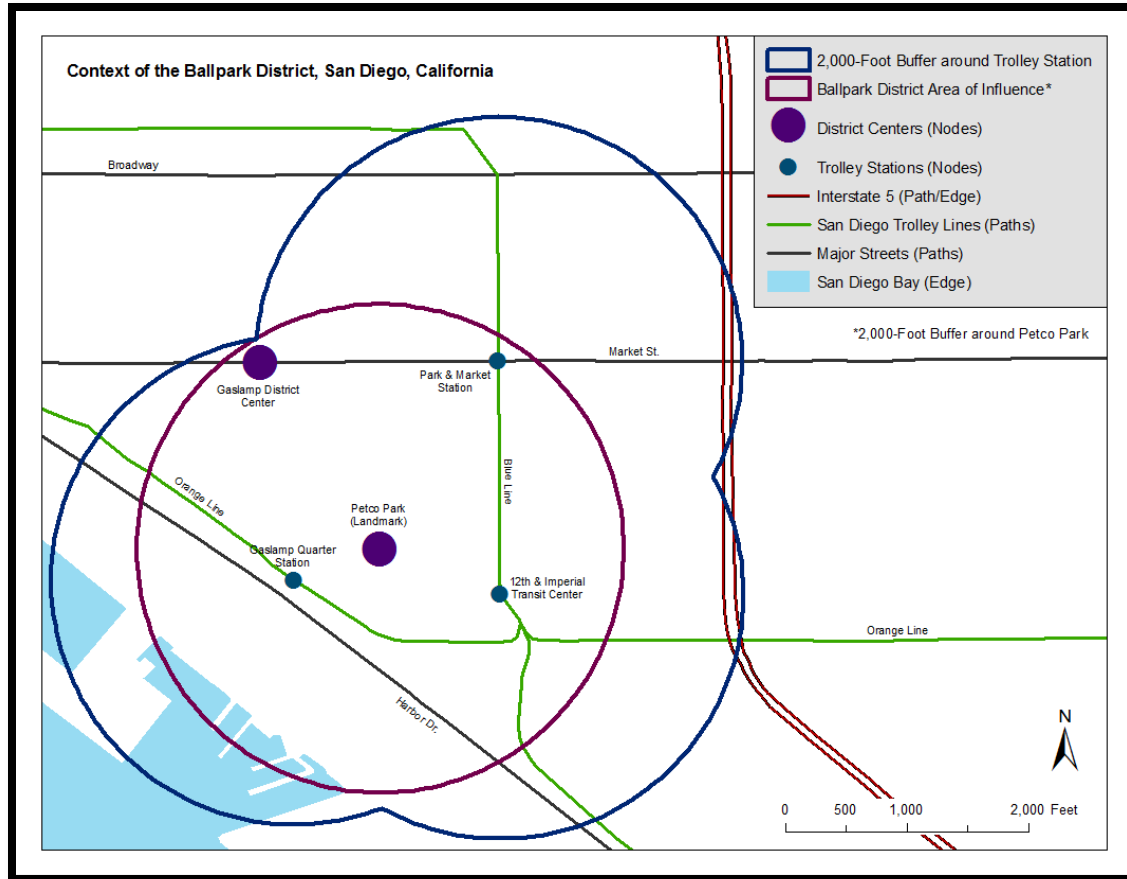


Figure A.17. Context of the Ballpark District.

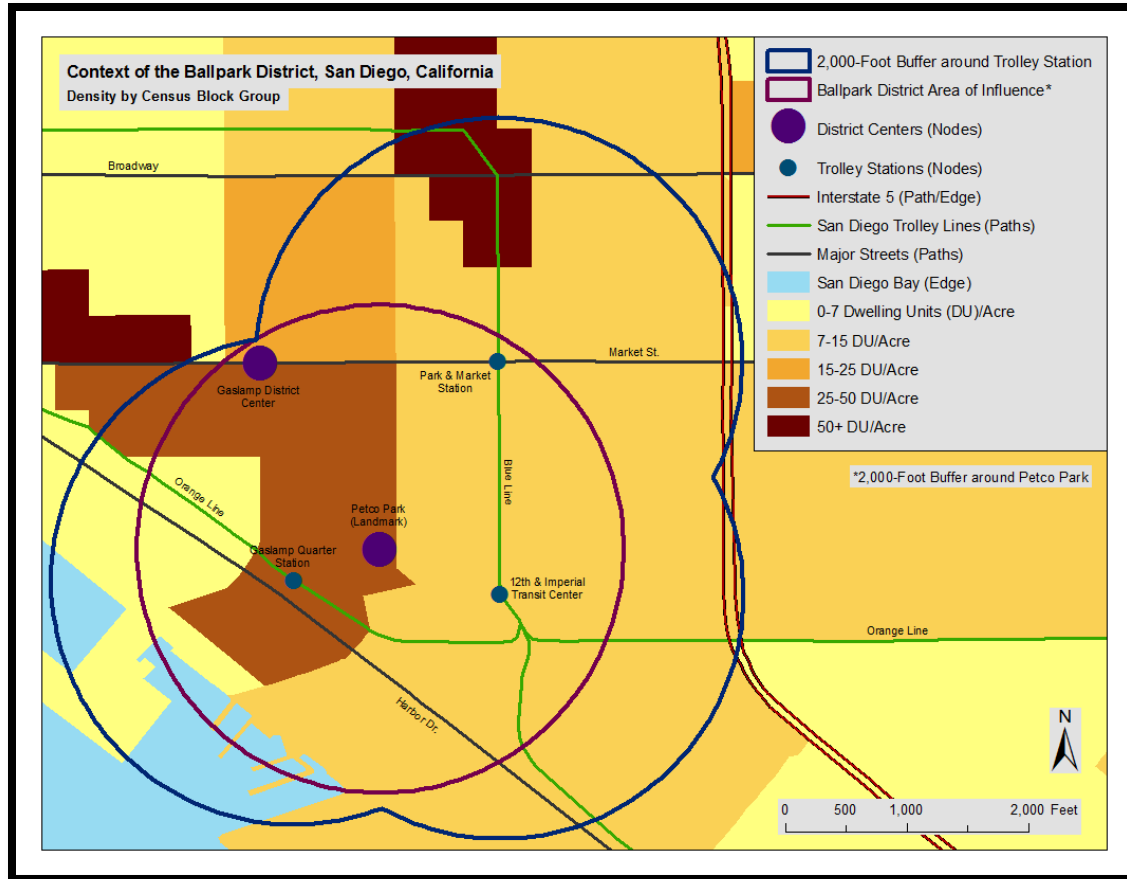


Figure A.18. Context of the Ballpark District: Density by Census Block Group.

Northeast Development, Arlington, Texas

Arlington, Texas, a suburban city in the Dallas-Fort Worth metropolitan area, has recently become home both the Texas Rangers baseball team and the Dallas Cowboys football team. Rangers Ballpark in Arlington, the stadium for the Texas Rangers, opened in 1994, diagonally across an intersection from Six Flags Over Texas, a large amusement park that serves as a major attraction in the southern U.S. Cowboys Stadium opened much more recently, in 2009, less than one mile from Rangers Ballpark. Cowboys Stadium, designed by the Dallas firm HKS Sports and Entertainment, quickly earned a reputation for innovative stadium design and has become a landmark in Arlington. The stadium features the world's largest retractable roof, the world's largest retractable glass doors, and even the world's largest space free of support columns (Connolly 2010).

Cowboys Stadium relates to a larger series of projects known as the “Northeast Development” in Arlington. In 2006 the City of Arlington received the American Subcontractors Association's Vision Award for Cowboys Stadium and the Northeast Development (City of Arlington 2007). However, the city does not provide many specific details about the Northeast Development. Rather than a physically defined urban development, the Northeast Development seems to be a more loosely defined economic development initiative, with the intent to bring high-profile businesses and activities to the northeastern portion of the city.

An aerial view of the area stretching from Cowboys Stadium to Six Flags shows what many urbanists would consider sprawl development—use-separated, automobile-oriented development of that type that characterizes most American suburbs. The general vicinity of the stadiums contains commercial development, single-family residences, and multi-family residential development, but site boundaries

separate all uses, and the standard hierarchy of streets prevails. Superblocks contain large developments, and parking lots separate commercial uses from streets. Furthermore, the area has a very low residential density. A GIS analysis shows that the 22 Census Blocks within a 2,000-foot buffer of the two stadiums have an average density of 2.4 dwelling units per acre, and the 55 Census Blocks that intersect the buffer have an average residential density of 1.8 units per acre (U.S. Census Bureau 2010).

Arlington's Northeast Development is relevant to Kansas City's Truman Sports Complex because of the proximity between Cowboys Stadium and Rangers Ballpark. The Northeast Development shows efforts to bring various land uses within relatively close proximity to the two stadiums, but it is not a walkable, mixed-use development in any way that even closely resembles a New Urbanist or a traditional urbanist sense. The superblock system and the lack of a permeable street grid, or even a network of pedestrian paths, makes the area less appealing for pedestrian

activity than would a development utilizing small blocks or well connected pedestrian paths. Furthermore, the only form of public transit that serves the area is the Arlington Trolley, a tourist bus that serves the stadiums, Six Flags, the Arlington Convention Center, and several nearby hotels (Arlington Entertainment 2009). In contrast, despite the lack of intense development adjacent to the Truman Sports Complex, bus transit already serves Kansas City's stadiums (Kansas City Area Transportation Authority n.d.), and rail transit on the Rock Island Corridor would enhance the stadiums' transit connections. Arlington's Northeast Development brings a variety of land uses close to the stadiums, but it does not function as a model for a transit-oriented development. Please see Figures A.19 through A.21 for maps of the Northeast Development.

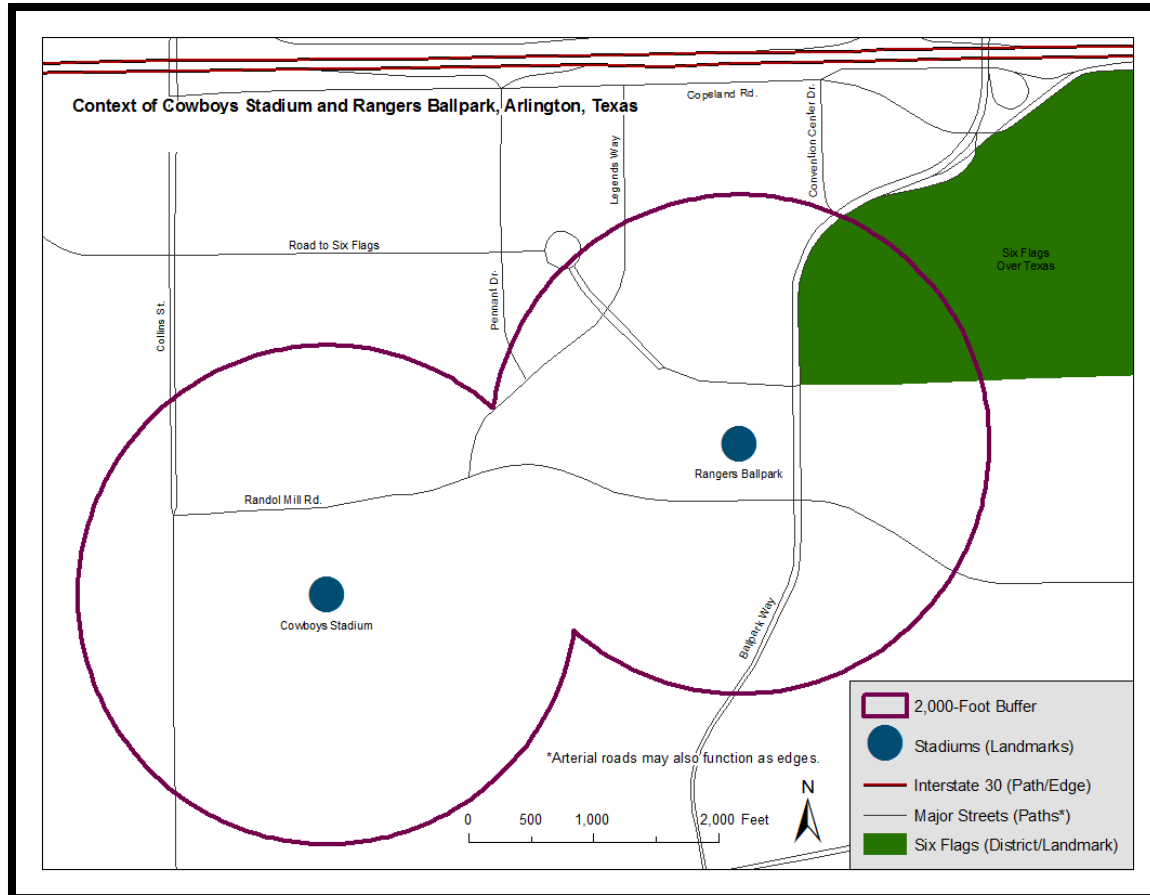


Figure A.19. *Context of Cowboys Stadium and Rangers Ballpark.*

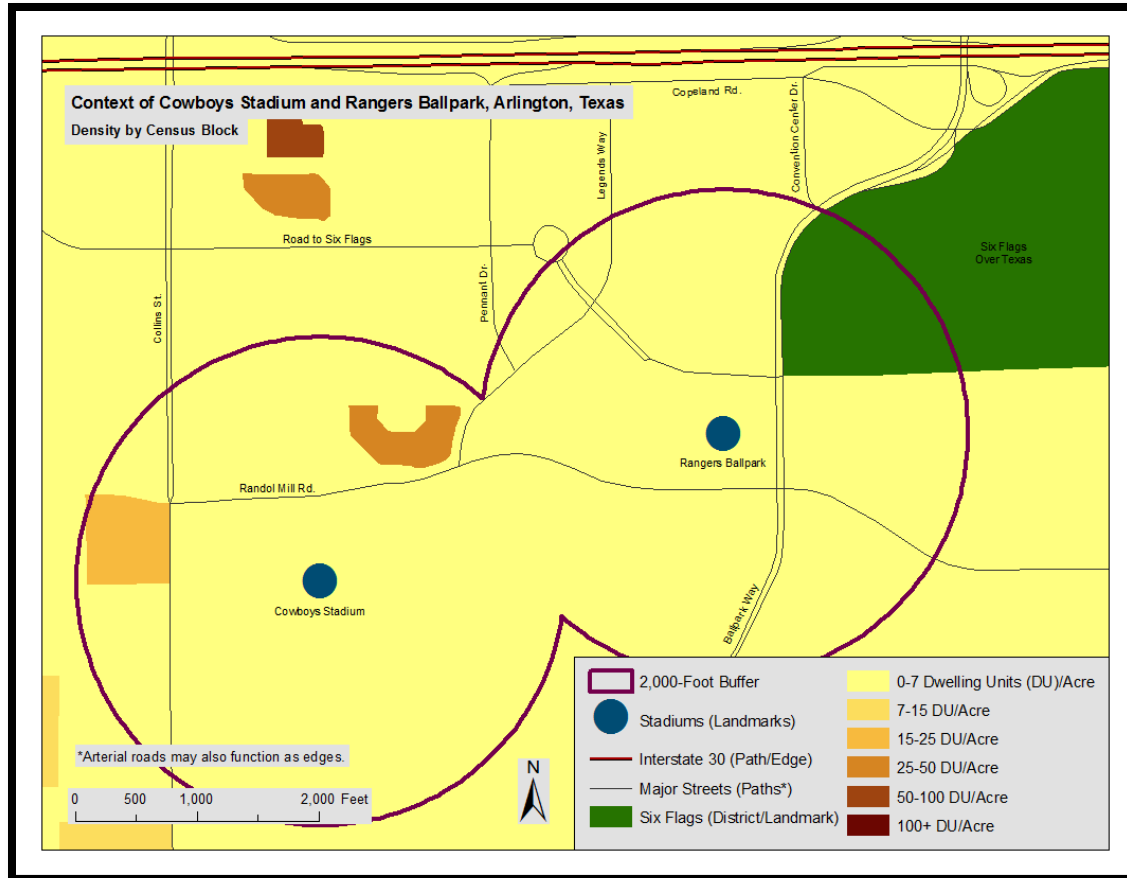


Figure A.20. Context of Cowboys Stadium and Rangers Ballpark: Density by Census Block.

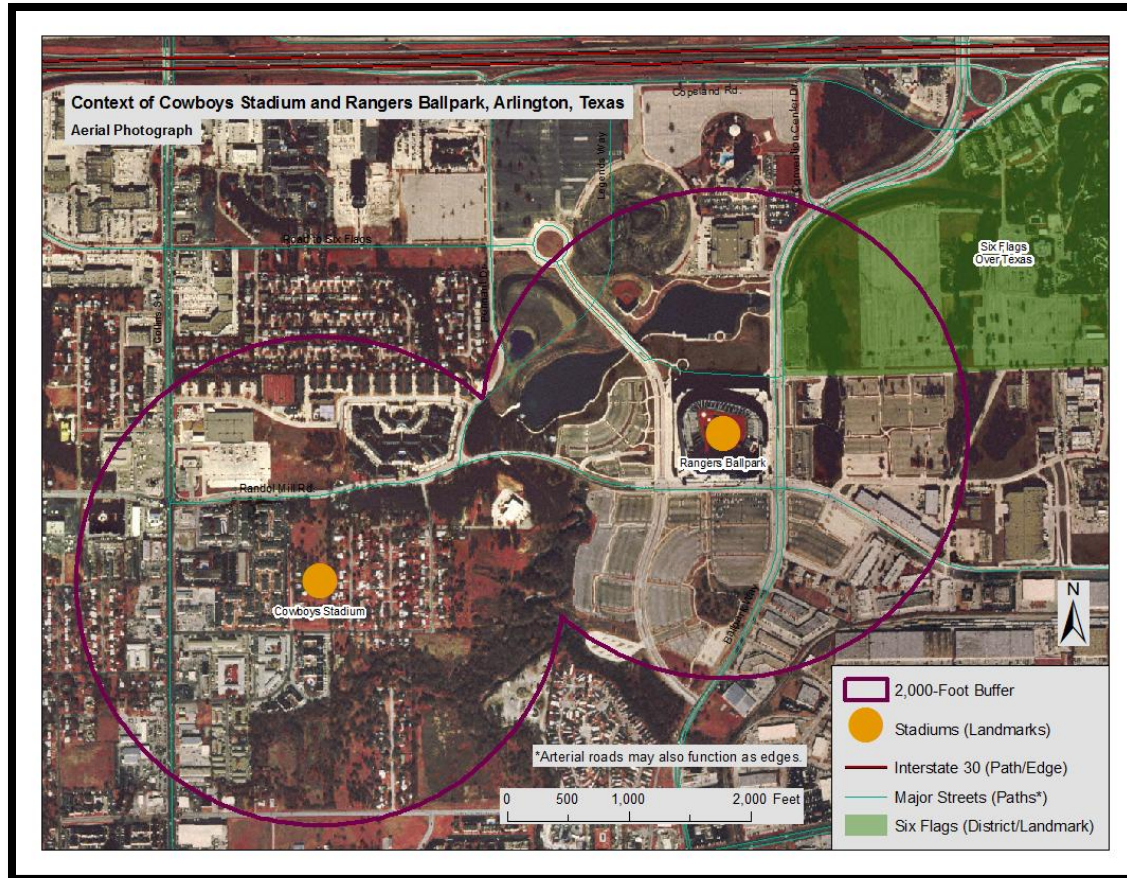


Figure A.21. *Context of Cowboys Stadium and Rangers Ballpark: Aerial Photograph.*

Other Stadium Areas

The main purpose of these stadium area precedent studies is to provide examples of attempts to connect professional sports stadiums with a mixture of surrounding land uses in some fashion. Two additional examples may provide insight into the possible nature of development surrounding suburban stadiums such as Kansas City's. Qualcomm Stadium in San Diego and Sports Authority Field at Mile High in Denver are two suburban stadiums that have gained rail transit service. In addition, they both have development surrounding their properties, but not in the pedestrian-oriented sense of Fenway Park, Paul Brown Stadium and the Great American Ball Park, and Petco Park.

Qualcomm Stadium, home of the San Diego Chargers football team, has a San Diego Trolley station serving it, practically at its front door; however, the rest of the stadium sits in the middle of a large parking lot. Interstate 15 bounds the Qualcomm Stadium site on

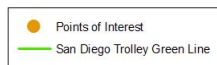
the east, and to the west, the next stop on the Trolley's green line serves a strip-style shopping center, a cluster of office buildings, and a multi-family housing development. The three-use development to the west of the stadium does not mix any uses into shared buildings or shared clusters; however a network of pedestrian paths seems to make the development accessible to transit riders, despite the shopping center having a large parking lot in its center. Although it lacks the small-block street system of a New Urbanist transit-oriented development, the development west of Qualcomm Stadium, accessible from Fenton Parkway Station, appears able to serve transit riders in addition to automobile users. However, a physical barrier, mostly tree-lined, separates the commercial and office development from the stadium. Please see Figure A.22 for a map showing the Qualcomm Stadium area.

Sports Authority Field at Mile High, opened in 2001 and formerly known as Invesco Field, is the stadium of the Denver Broncos football team and is approximately two miles west of downtown Denver. One would

perhaps best characterize the context of Sports Authority Field as a transition between urban and suburban areas. Although the South Platte River, Interstate 25, and the Auraria Campus separate the stadium from downtown, a light rail transit line serves the stadium. A pedestrian bridge across the South Platte River and a path under the freeway provide access between the stadium and the light rail station. Elitch Gardens, an amusement park, is at the next stop to the northeast on the light rail line. Some commercial development, including a hotel and restaurants, is adjacent to the Sports Authority Field site, but none of it is mixed-use development. Furthermore, most of the stadium property itself consists of large parking lots, although wide, landscaped pedestrian paths connect the stadium to surrounding land uses in four directions, and a network of sidewalks and pedestrian paths extends beyond the stadium site. Please see Figure A.23 for a map of the area around Sports Authority Field at Mile High.

In order for the Truman Sports Complex site to reach its full potential, a true mixed-use development, immediately next to the stadiums and directly accessible for pedestrians, seems to be an ideal goal. Although Qualcomm Stadium and Sports Authority Field at Mile High represent significant efforts to connect stadiums to light rail transit and to bring sports venues within close proximity of compatible development, neither has the type of integrated, well connected, mixed-use development that would best serve the Truman Sports Complex and its associated future rail transit station. A project such as the Banks in Cincinnati or the Ballpark District in San Diego would provide a better mixture of uses and a better setting for pedestrian activity, although the site's distance from downtown Kansas City will require special considerations.

Qualcomm Stadium, San Diego, California

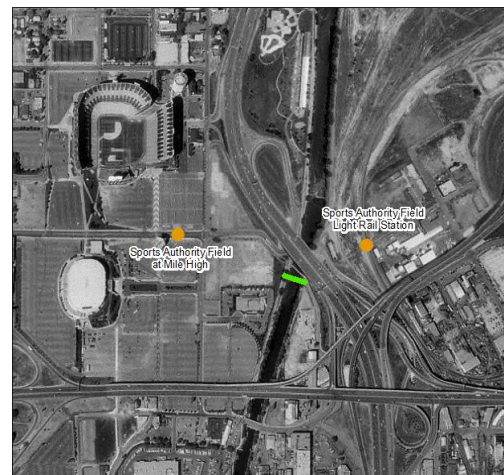


0 500 1,000 2,000 Feet



Figure A.22. Qualcomm Stadium.

Sports Authority Field at Mile High, Denver, Colorado



0 500 1,000 2,000 Feet



Figure A.23. Sports Authority Field at Mile High.

Site Feature: Public Plaza

Surveying the Truman Sports Complex site raises the question of what would be the best use for the space between the two stadiums, currently another parking lot. A public plaza, activated with pedestrian activity and having a sense of enclosure provided by the two tall structures, would provide an important connection between the stadiums and would serve as a node for both the sports complex and the transit-oriented development. The space is approximately the size of a city block, and many similarly sized public plazas in cities across the U.S. could provide inspiration for the design of this plaza.

Barney Allis Plaza is an important public space in downtown Kansas City, Missouri. Located between 12th, 13th, Central, and Wyandotte Streets, this block-sized plaza has the potential to serve as a focal point for much of the downtown's activity. Bartle Hall, Municipal Auditorium, and multiple hotels surround the plaza, and the Kansas City Power and Light District

is only two blocks away. At a time when downtown Kansas City lacked the park space and open space for which Kansas City has been known, Barney Allis Plaza was a notable example of the potential for downtown park space (Kansas City Redevelopment Authority 1983, 36-37). Barney Allis Plaza's main features include fountains, sculptures, and outdoor tables with seating. At the plaza's center is a tennis court for the Kansas City Explorers World Tennis Team. The plaza sits atop a 1,000-space parking garage (City of Kansas City 2011), serving much of the downtown's parking demand without taking surface space from downtown activity. The tall hotel buildings that line Barney Allis Plaza on its north and east sides give the plaza a sense of enclosure that helps define it as an urban space. Please see Figure A.25 for a map showing Barney Allis Plaza.

Mellon Square in downtown Pittsburgh, Pennsylvania, similar in size to Barney Allis Plaza in Kansas City, is a more famous example of city-block public plaza. Designed by John Ormsbee Simonds,

Phil Simonds, James A. Mitchell, and Dahlen K. Ritchley—a team of landscape architects and architects—Mellon Square opened in 1955 to become the first modernist public plaza built on top of a parking garage. Pittsburgh considered this use of the site, located between Oliver Avenue, Sixth Avenue, Smithfield Street, and William Penn Place, to be a solution to downtown traffic congestion, based on 1940s parking studies. The parking garage has six levels and is mostly underground. The plaza itself is, in a sense, a precedent for rooftop gardens, and in 2008 the American Planning Association named it one of America's Ten Great Public Spaces (Pittsburgh Parks Conservancy 2011). Mellon Square is an active public space, owing to its enclosure by the surrounding urban fabric and tall buildings, including the historic Omni William Penn Hotel. Its functionality as a public space is different from that of nearby Gateway Center, which historically attracted far fewer visitors. The difference lies in treating the park as the foreground and the buildings as background, as in Mellon Square, rather than treating a park as a setting for buildings, as in

Gateway Center (Jacobs 1961, 106). Please see Figure A.24 for a photograph of Mellon Square as well as Figure A.26 for a map showing the park.



Figure A.24. *Mellon Square in Downtown Pittsburgh, Pennsylvania.*

Although the setting of the Truman Sports Complex is fundamentally different from a downtown, any kind of urban development surrounding the stadiums could benefit from transforming the parking lot between the stadiums into a significant public space for pedestrian activity and leisure. Attendees of games would have a place to gather after the main event, on their way to restaurants and bars, or to the rail station, or to their cars. Nearby residents and office workers would have a

space to relax outdoors, framed by the two giant Kansas City landmarks that gave the land its first reason for development. This location for a public plaza seems an obvious choice, but it will make the decisions for the surrounding development all the more critical.

Barney Allis Plaza, Kansas City, Missouri



Figure A.25. Barney Allis Plaza.

Mellon Square, Pittsburgh, Pennsylvania



Figure A.26. Mellon Square.

Conclusion

These varied precedents provide a range of insight into the possible solutions for intensifying development around professional sports venues. They range from urban to suburban, and from mixed-use to use-separated developments. A stadium-adjacent development in a suburban context with a mixture of uses within the same small blocks, and within the same buildings, seems to be an unrealized idea. However, for the purpose of creating a transit-oriented development that functions as a true urban node rather than a loose collection of shops, offices, and residences, the idea seems worth pursuing. No evidence suggests that the presence of the stadiums would be a detriment to a TOD. In Boston's Fenway-Kenmore Neighborhood and in San Diego's Ballpark and Gaslamp Districts, the presence of a stadium defines a place's identity and draws more people to it. In the case of Cincinnati's The Banks project, the two stadiums served as a catalyst for the new riverfront development. The only idea that is almost certainly

unrealistic on the surface is to assume that Kansas City's suburban area around the sports complex will quickly transform into a bustling urban center. Change needs to begin at some point, however, if it will ever occur at all. Setting a spatial framework with patterns of streets, building masses, and recreational space may be a realistic starting point for transitioning a vast, gray surface into a diverse, regional activity center.

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