VISIONS FOR COTTONWOOD HEIGHTS
FORT UNION BOULEVARD STREETSCAPE, TRANSIT + REDEVELOPMENT STUDY

UTAH URBAN DESIGN STUDIO MONOGRAPH 1

UNIVERSITY OF UTAH
COLLEGE OF ARCHITECTURE + PLANNING
CMP 6446 / ARCH 6031
Urban Design Practice Studio - Fall 2013

March 2014




Written and Edited by:

Michael Larice, Associate Professor
Melissa Fryer, Research Assistant

TABLE OF CONTENTS

ACKNOWLEDGMENTS		3
1	INTRODUCING FORT UNION BOULEVARD	5
2	EXISTING CONDITIONS + SITE CONTEXT	11
3	VISIONING + PRINCIPLES FOR COTTONWOOD HEIGHTS	39
4	TRANSIT + PUBLIC REALM IMPROVEMENTS	61
5	CATALYTIC REDEVELOPMENT PROPOSALS	103
6	CONCLUSIONS + RECOMMENDATIONS	131
7	APPENDICES	135
BIBLIOGRAPHY		172
IMAGE + PHOTO CREDITS		173
UNIVERSITY OF UTAH		196

ACKNOWLEDGMENTS

Visions for Cottonwood Heights was prepared by faculty and students in an Urban Design Studio at the University of Utah's College of Architecture + Planning during Fall Semester 2013 and Spring Semester 2014. Students from the Department of City + Metropolitan Planning and the School of Architecture were responsible for the production of the studio work with guidance from their instructor team of Michael Larice and Jack Robinson. Jack Robinson provided incredible logistical support and leadership in achieving the great success of the studio. The bulk of writing, design and editing of the monograph was completed by Michael Larice and Melissa Fryer.

The studio was funded by a gift from the City of Cottonwood Heights, Utah. We are grateful to these institutions and their staffs for their generous support of the studio, as well as their assistance in site tours, civic engagement events, client meetings, and public presentations. We are particularly thankful for the efforts of Brian Berndt from Cottonwood Heights' Department of Community and Economic Development without whose help the studio would not have been possible. We also thank Maria Vyas of Fehr & Peers, who provided invaluable transportation planning inputs. We appreciate the help and guidance we received from residents, shop owners and municipal leaders who took the time to engage us in meetings, workshops and serendipitously in the city. We are grateful for all their help.

The students and faculty would like to thank the following people and organizations who contributed to the studio:

CITY OF COTTONWOOD HEIGHTS

Kelvyn H. Cullimore, Jr. ..... Mayor
Scott Bracken ..... Council Member
Mike Peterson ..... Council Member
Mike Shelton ..... Council Member
Tee Tyler ..... Council Member
John Park ..... City Manager
Brian Berndt ..... Director of Community + Economic Development
Larry Gardner ..... Senior Planner
Mike Johnson ..... Planning Technician
Kevin Sato ..... GIS Specialist
Robin Walton ..... Planning Intern

THE UNIVERSITY OF UTAH

Nan Ellin ..... Chair, City + Metropolitan Planning
Jeannette Benson ..... Advisor, City + Metropolitan Planning
Mayra Focht ..... Administrative Assistant, Architecture
Molly Burkhart ..... Office Assistant
Don Burris ..... Information Systems Assistant
Robbi Richter ..... Director of Development

STUDIO CRITICS + PARTNERS

Keith Bartholomew ..... Assoc. Professor, City + Metropolitan Planning
Julie Bjornstad ..... Transportation Planner, Fehr & Peers
Brett Coulam ..... Strategic Planner, UTA
Nan Ellin ..... Chair, City + Metropolitan Planning
Brianne Emery ..... Strategic Planner, UTA
Reid Ewing ..... Professor, City + Metropolitan Planning
Amir Hajrasouliha ..... PhD Student, City + Metropolitan Planning
Stephen Goldsmith ..... Assoc. Professor, City + Metropolitan Planning
Matt Miller ..... PhD Student, City + Metropolitan Planning\
Jon Nepstad ..... Principal, Fehr & Peers
Molly Robinson ..... Urban Designer, Salt Lake City Planning Division
Phil Stoker ..... PhD Student, City + Metropolitan Planning
Maria Vyas ..... Senior Transportation Planner, Fehr & Peers
Robert Young ..... Professor, Architecture

INTRODUCTION

PROBLEMATICS OF THE URBAN ARTERIAL IN AMERICA

The unlivable urban arterial remains one of the unsolved urban design challenges of early 21st Century America. From coast to coast and in nearly every city, the urban arterial poses a challenge to pedestrians, cyclists, and residents who desire safety, comfort, and places that are imbued with local character. Instead, the urban arterial is designed for the efficient movement of motorized vehicles through the city and to connect places within the region. As designed and engineered, this is often the only goal of the urban arterial. Little space is reserved for cyclists. Transit is stuck in traffic. Pedestrians are often an afterthought. The visual quality of the urban arterial is most typically associated with mid-20th Century commercial highway, ala Route 66: large signage viewable from miles away, huge seas of asphalt parking, googie architecture, undistinguished big box shopping, cookie-cutter franchise outlets, fast food, no sense of aesthetic harmony, poor connections to neighborhoods, few opportunities to sit, socialize or linger. Many arterials host obsolete buildings, vacant businesses, unacceptable congestion, and few amenities. The time is ripe to meet this challenge.

Research by Scheer and Larice helps to better understand the functionality and purpose of the urban arterial. "Definitions for the urban arterial are typically provided by professional engineering associations such as the Institute for Transportation Engineers (ITE et al, 2009) and the American Association of State Highway and Transportation Officials (AASTHO, 2011), as well as various US federal government and state organizations (US Dept of Transportation; US Federal Highway Administration). Within street classification systems, the urban arterial typically falls between the limited access highway and the collector street. Urban arterials are subsequently differentiated between principal arterials (whose function is inter-city and cross-city mobility and the connection of collector streets to major highways) and minor arterials (whose function is more access oriented in connecting collector streets and major destinations). Arterials are intended for longer distance travel between destinations, at speeds that are relatively unimpeded (except for traffic signalization which controls both speed and entry into the arterial system).

Depending on density levels and surrounding uses, 30-50 mph speed limits are typical. Arterial alignments are typically composed of a minimum of two lanes in each direction, often with a center contraflow lane or alternating left turn lane. Sometimes they are divided by median strips and planted areas. With respect to efficient functioning of the urban arterial, transportation engineers frequently seek to limit design elements that would inhibit traffic flows, level of service, and intended design speeds, including: landscape components, visual obstructions, lane narrowing, streetside parking, and property curb-cuts. This focus on capacity, speed and function often results in signage sized for faster driving speeds, streets that lack local place quality, and land uses dependent on high traffic volumes and larger market catchment areas." (Scheer and Larice, 2013)

Remaking the urban arterial is a growing strategy in fostering more sustainable cities, particularly when the option of mass transit is included in the mix. Re-engineering and redesigning arterials to accommodate multiple modes of transportation will help to conserve natural resources, protect the environment, help to slow climate change, and improve the retail and social life of local places. Improving the livability of urban arterials is of growing interest to progressive planners, municipal leaders, transportation engineers, and urban designers. A number of recent street movements are pushing the evolution of the unlivable street at the federal, state and local levels. In addition to the livable streets movement itself, other like-minded trends include: context sensitive design; complete streets; green streets; traditional streets; 'Great Streets'; road diets, and other street redesign movements. Our approach to redesigning Fort Union Boulevard will incorporate principles and ideas from many of these.

INTRODUCING COTTONWOOD HEIGHTS + FORT UNION BLVD

Cottonwood Heights, Utah is a relatively new municipality (incorporated in 2005) located in Salt Lake County, Utah. Known as the "City between the Canyons," it sits on a ridge between the mouths of Big Cottonwood Canyon and Little Cottonwood Canyon. As a mostly middle- and upper-middle class single family residential community, the city houses one of the older populations in the State of Utah. To the north of the city lie the municipalities of Holladay and Murray; to the west can be found Midvale; and to the south sits Sandy.

Cottonwood Heights was recently named one of the top 100 places to live in the United States. In the northwest of the city can be found an increasingly growing corporate center, and a still-operating quarry, which will be converted to other uses when it's lease runs out in a couple decades. The city is rich with corporate headquarters, including: Café Rio, JetBlue Airways, Overstock.com, and Dyno Nobel.

At the north of the city runs the urban arterial of Fort Union Boulevard. It is one of the key east-west urban arterials crossing the Salt Lake Valley and connecting people up Big Cottonwood Canyon. It is a principal arterial providing access for both residents and non-residents to destinations throughout the valley, and secondarily providing local connections between neighborhoods and retail offerings. Many regional motorists use it as a bypass that allows east-west movements more rapidly than other more intuitive options. It is an arterial that has grown larger in both right-of-way scale as well as traffic loading over time. Congestion pressures have resulted in 'silent' incremental growth of the road to the stage where it is nearing a 'point of no return' with respect to prospects for conscious change. Engineers and city officials continue to 'improve' the street's function by adding dedicated turning movements and through lanes in response to transport and resident concerns. This creates a more unsustainable and more unlivable street that will soon rise to a scale where local officials will lose control of future possibilities.

Properties along the edge of Fort Union Boulevard are typical

of most American urban arterial streets: big box retail, auto-oriented uses, fast food outlets, local serving retail, a smattering of residential and institutional uses, strip malls, supermarkets and vast expanses of asphalt parking lots. The City's current municipal offices are housed in a non-descript office building. Several big box stores are vacant. Concerns have been expressed about the livability and 'placeless' quality of Fort Union Boulevard's shopping, service and are associated with the unharmonious roadway aesthetics. For a city with such a stable population and relatively comfortable economics, it is surprising that the City hosts so few opportunities for desirable shopping, dining, entertainment and retail. On the flip side, Cottonwood Heights has a history and a few gems waiting to be polished: an old paper mill, a desire for quality, a regionally notable local Mexican restaurant, a debt-free municipal government, a city council with the political will to forcibly evolve the street, and a courageous planning staff that recognizes the threat posed by inaction.

In summer 2013, University of Utah urban design professor Michael Larice met with Brian Berndt and Larry Gardner (the Cottonwood Heights planning leadership) to discuss the possibility of partnering to address the issues of Fort Union Boulevard. Although another studio client had previously been scheduled for the fall 2013 studio, they decided at the last minute to postpone their studio slot to another semester. The new fall semester studio opening was then taken by Cottonwood Heights. That café meeting produced an initial set of understandings that later led to a gift from Cottonwood Heights in support of a collaborative urban design studio.

URBAN DESIGN STUDIOS AT THE UNIVERSITY OF UTAH

The University of Utah recently established a graduate certificate in urban design, jointly operated by the Department of City + Metropolitan Planning and the School of Architecture. The certificate program includes an introductory studio and a practice studio, in addition to a suite of foundational and elective courses. Since its inception in 2011, the certificate has enrolled dozens of students, partnered with a handful of cities, and completed 5 client-based studio projects. This is the first monograph emerging from this new urban design program.

The fall semester Urban Design Practice Studio traditionally focuses on the development of shared and discrete professional roles (architecture/planning/urban design) within a collaborative multi-stakeholder project framework. The first part of the studio involves site and case study analysis. The middle part of the studio involves group strategic and schematic work. The final element of the studio revolves around individual design work within the group framework. In addition to these physical elements, the studio will also involve strategic urban design decisions in the redevelopment of an urban district including: synthesizing vast amounts of information; prioritizing key issues; strategic vision planning and design programming; creative problem solving; and producing a set of professional quality deliverables (both collectively and individually). Design studios are an opportunity for students to begin discovering and honing their individual design voices, but also about learning to

communicate with different work groups, professions, and clients in affecting a more valued public realm.

The public realm is a significant element of cities throughout the world – the parts of the city that help to provide imageability, experience, memory, function, and service. The public realm exists alongside private development, which is often a catalyst for implementing public realm investments. Successful public realm making usually results from bringing together the physical, economic, and social factors of cities to effect public improvements. Increasingly, public realm projects are part of larger development proposals that include private sector projects, management and finance. It is well understood that a successful urban public realm is the result of the interplay between the built form of cities, the engineering and design of infrastructure systems, and functional programming of space. The social scientists of the 1960's, 1970's and 1980's deemed that successful and defensible spaces come about through the integration and interface of these components. This is a principal concern of politicians, design professionals, developers, communities and many other urban actors.

The primary objectives of the studio are educational; to expose and engage students in urban design issues and skills building exercises that can help prepare them for future careers in urban design, architecture and planning. Students come from a variety of backgrounds. Some of them have previous design expertise; all are in the middle of a 2 or 3 year graduate degree in planning or architecture. They come to this studio with little prerequisite design knowledge. Design projects in the studio typically focus on both large- and small-scale urban projects, which have a public realm focus. As an academic studio, it has a final end date after which the students depart and are not expected to further engage in the studio project and deliverables. This is different from standard project consulting or community development projects, where consultants can be retained over an extended period.

Parallel to these educational objectives, design goals in the urban design studios typically take a pragmatic and real-world approach to addressing challenges and expanding the assets of our sites, stakeholders or clients. Our studios incorporate a wide variety of professional perspectives, including development, environmental, economic and political concerns. Urban design at The University of Utah is typically explored through an expansive sustainability filter, looking at the full panoply of social, economic and environmental issues. The academic studio setting can provide our clients and stakeholders with an opportunity to explore options and urban design issues in a low-pressure / low-key manner that helps to avoid potentially uncomfortable airing of issues and design discussions in public

The primary objectives and student learning outcomes of our urban design studios are to provide students with the basic skills necessary for participating in the urban design field as direct or indirect urban designers. Specific objectives for this studio include the following: 1. To introduce students to the language and terminology of strategic design planning and urban design practice; 2. To provide direct experience in site

analysis, strategic visioning, skills development, creativity, writing, communication and presentation techniques commonly used in the urban design field; 3. To provide an understanding of the urban design roles assumed by city planners and architects, as well as its integrative nature in bringing a variety of built environment disciplines together collaboratively in practice; 4. To connect theory in urban design and development to the traditional built environment fields, including the key drivers of sustainability and livability; and, 5. To develop key faculties in critical evaluation of the existing built environment, project design, and outcomes.

Many of the urban design studios we run at the University of Utah include a client relationship where a set of deliverables is provided at the end of the studio. Building on the tradition of other urban design programs in the United States, we expect to produce a monograph for each funded studio. This will provide the client with a record of the design work, but also an expanded discussion of the issues associated with the studio content. The monograph series will also provide the College with some form of institutional memory about each funded studio that we stage. This Cottonwood Heights studio is the first in the Utah Urban Design Monograph Series.

THE VISIONING STUDIO FOR FORT UNION BOULEVARD

The course syllabus outlined the expectations and deliverables for the studio. Those key deliverables were: the monograph at hand; transit and streetscape alternatives; land use and zoning recommendations (forthcoming); redevelopment and infill proposals; options for redevelopment; and feasibility and costing (forthcoming). In addition the students were to conduct civic engagement exercises in Cottonwood Heights and make regular presentations to the client. The studio included 4 client presentations, an internal presentation to university faculty and several site visits, the first of which was conducted by the planning leadership of Cottonwood Heights.

After a few weeks looking at the context and site conditions and a presentation to the client (summarized in Chapter two), the students were able to engage the City Council, civil servants, and members of the public in a visioning exercise. The results of this civic engagement exercise are included in Chapter three, along with a synthesized set of vision statements and design principles culled across the semester from the variety of exercises the students were assigned.

Two sets of design deliverables were targeted for the studio: 1. a set of alternative transit and streetscape designs to re-imagine Fort Union Boulevard, each associated with a different mass transit mode: bus, bus rapid transit, streetcar, and light rail. These would be informed by a group of selected case studies that could help the students learn about the issues associated with each transit type; and 2. catalytic redevelopment proposals at selected nodal points along Fort Union Boulevard that can be used as illustrative opportunities to demonstrate how these places can be re-imagined and infilled to improve their livability and experiential qualities. The intention of this approach was to help increase transit ridership and improve livability of the street and larger city.

Associating street design with redevelopment was also done in response to suggestions that the larger brand and image of the city might also be examined in the semester-long project. This second design deliverable was informed by a set of case studies that approximated the redevelopment types that the students would later design: lifestyle centers, district redevelopment, civic centers, etc. The students produced six different designs for Fort Union Boulevard, which are detailed in Chapter 4. These are outlined briefly here:

1 a modest streetscape design that retains standard bus service and provides the least expensive of the alternatives;

2 a bus boulevard in the form of a multi-accessway road design, where bus service would move along buffered side access lanes with slower moving local traffic, and faster moving through-traffic at the center;

3 a bus rapid transit design that would provide dedicated bus lanes at the center of the right-of-way;

4 a first streetcar design where a central median and streetscape was associated with indigenous planting. This we called the streetcar meadow line;

5 a second streetcar design where a central median and streetscape built on the case study example of the Ramblas in Barcelona, where the median is used for shopping and strolling. This we called the strollevard;

6 a light rail transit design that approximated similar design standards as other Trax LRT lines, where dedicated rail lines are at the center of the right-of-way.

In addition to those six deliverables the students also produced three catalytic redevelopment proposals. These included the following:

1 a new town center development near 1300 E and Fort Union Boulevard that infills the Target / Home Depot parking lot, replaces a strip mall, and provides new retail, housing, entertainment and dining options;

2 a new civic center precinct at Highland and Fort Union Boulevard, along with a welcome center, museums, other institutional uses, and an urban nature trail;

3 an approach to infill development along Fort Union Boulevard that helps disparate uses seem larger than the sum of their parts, and creates a new lifestyle center around the street.

The studio concluded with the production of this monograph. The authors filled in missing material, synthesized the material for the visions and design principles, wrote the recommendations and conclusions, and formatted the book.

EXISTING CONDITION + SITE CONTEXT

INTRODUCTION

At the start of nearly every educational studio undertaking (or professional project for that matter), urban designers find themselves working in environments where they are unfamiliar with the site context, cultures of use, political and economic circumstances, history, ecology, natural and physical conditions, systems, issues, and assets. This list can go on and on – often to the point of analysis paralysis. More often than not, in practice it becomes incumbent to collect as much data as possible about that environment, convert it into useful information, and prioritize the key lessons that will impact later design work. Urban design work is often richly influenced by this effort and at the very least the designer becomes an informed professional. As students move toward practice and eventually become professionals, it becomes their obligation to share pertinent information about the site with their clients and inform them of initial impressions. The goal for this first phase of the studio was to achieve as much useful and directed familiarity with the site as possible for purposes of studio-wide education. Often, the site analysis phase results in retargeting design expectations and iteratively influencing project possibilities. This process of learning about the site does not conclude at the end of a first attempt at data collection, and typically continues throughout the design process.

Typical to most design studios, this data gathering phase and site learning process stops with a thud at the end of the exercise – unlikely to be picked up again or truly incorporated into design decision-making. Site analysis and learning in our urban design studios takes a different approach. Rather than a mere 'data dump' where students gather data and report back, we ask the student for an evolution of data until it is turned into design useful implications. DATA is collected (field work, observations, secondary research, archival research) and is filtered into INFORMATION; Information is then analyzed for the LESSONS it can teach; Lessons are then applied back to the design project or program to uncover the PRIORITIZED IMPLICATIONS they hold for future design activities. In this way the site and context analysis is carried through to directly impact design decision-making. We asked the students to engage this phase of the project with as much rigor as possible due to its impact on final outcomes.

After an initial site visit to Cottonwood Heights with guidance from the city's planning officials, five groups were put together to collect data and process this into pertinent design implications. These groups focused on the following issues:

1 NATURAL AND PHYSICAL CONDITIONS topography; hydrology and drainage; orientation + climate; vegetation; environmental features; constraints + opportunities;

2 ROADWAY INFORMATION street sections; alignments; sidewalks; infrastructure locations; roadway conditions ; constraints + opportunities;

3 TRAFFIC INFORMATION volumes; peak hour loading; average daily traffic; black spot analysis; transit

NATURAL AND PHYSICAL CONDITIONS

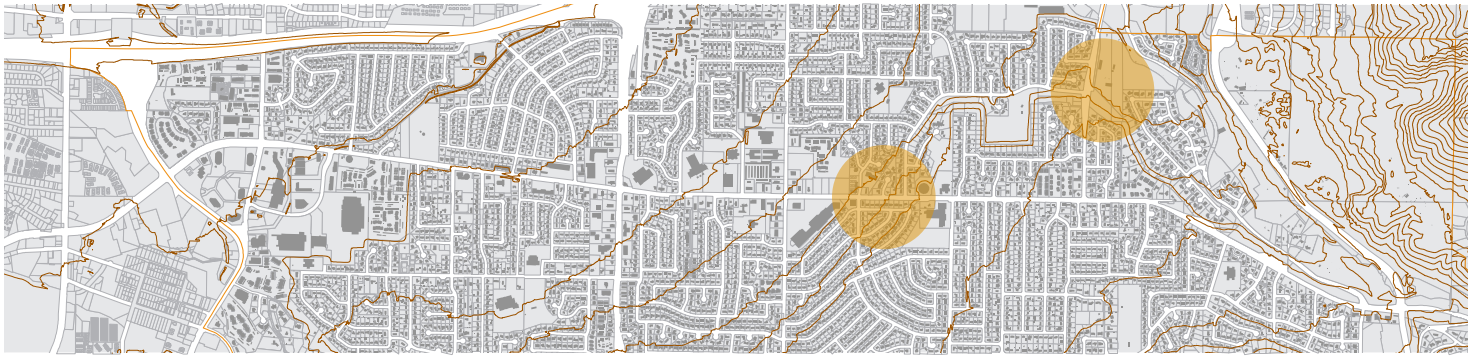
4th South TRAX line in Salt Lake City: demonstrates the ability of the light rail cars to be able to climb steep slopes often found along the benches of the Wasatch Front

TOPOGRAPHY

Cottonwood Heights sits on the bench of the Wasatch mountain range. Fort Union Boulevard is the only east-to-west thoroughfare which runs through the entirety of Cottonwood Heights, Utah. Along the way, this major urban arterial goes from an elevation of 4,920 feet at the intersection with Wasatch Boulevard, to 4,445 feet at Union Park Avenue, to 4,375 feet at Bingham Junction TRAX station in Midvale. Overall, this amounts to a 545 foot elevation change, 475 of which occur in Cottonwood Heights. The slope of the bench runs west-northwest across Cottonwood Heights. The change happens gradually for most of the length of Fort Union. A steep section, commonly called Brighton Hill, occurs just west of 2300 E and Fort Union. At nearly a 9% grade, it falls just inside of the vertical limitations of rail-based mass transit. The hill north of Fort Union on 3000 E also passes this test. Other than these two hills, the slope of Fort Union does not pose too much of a burden on pedestrians. Brighton Hill could act as a natural buffer between higher density development around 2300 E and Fort Union and the surrounding single-family home suburban density to the west.

IMPLICATIONS

- Elevation falls 545 feet from east to west
- Brighton Hill and 3000 E lie within the 9% grade rail limitation
- Most of Fort Union's slope is pedestrian friendly



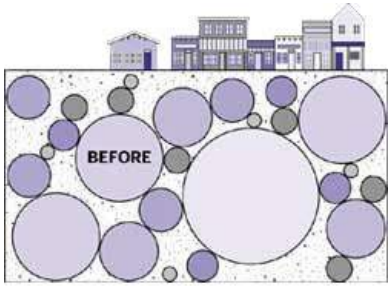
A topographic map of the area shows the steepest points along Fort Union Boulevard highlighted in orange: though one of the sections is not located directly on Fort Union, potential routing configurations could bring transit alternatives to this street as well

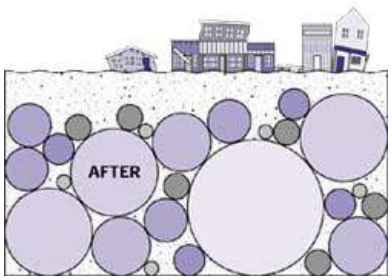
A streetcar from the Portland Streetcar line: streetcars similar to this model are able to climb hills that have a 9% grade

3000 South: from this image looking south the road reaches it maximum grade for light rail and streetcar, however, the slope is still within the acceptable range

2300 E and Fort Union Blvd the road begins to ascend: this section represents the steepest point within the Fort Union street corridor. By the time the road has reached 2700 E the slope reduces and the climb toward Wasatch Blvd becomes more gradual

IDEA Bioswales: such as the example pictured here could improve the storm water runoff along the street





Liquefaction: though not a major threat, there still is potential and engineering standards should reflect this

HYDROLOGY AND DRAINAGE

In general, water runs downhill. Big Cottonwood Canyon is a protected municipal watershed flowing out of the canyon in the form of Big Cottonwood Creek. As for the precipitation in Cottonwood Heights, rainfall and snow melt currently drain downhill (northwest) along the street grid. Storm water flows in street gutters, initially sluicing west downhill until meeting north-south street gutters. Fort Union itself, like parking lots and other impermeable surfaces, channels runoff to these street gutters. Streetscape and roadway improvements could better handle water by slowing and/or capturing precipitation. Vegetation, vegetation placement, curb types, bioswale options, and pavement choices could all be harnessed to improve the handling of freshwater rainfall. The water table itself is quite low—the highest on record being 80 feet deep in the 1960's. It poses no issues for construction.

IMPLICATIONS

- Big Cottonwood Canyon is a protected municipal watershed
- Rainfall drains downhill (NW) along the street grid
- Decrease runoff burden and increase freshwater supplies by using streetscape improvements

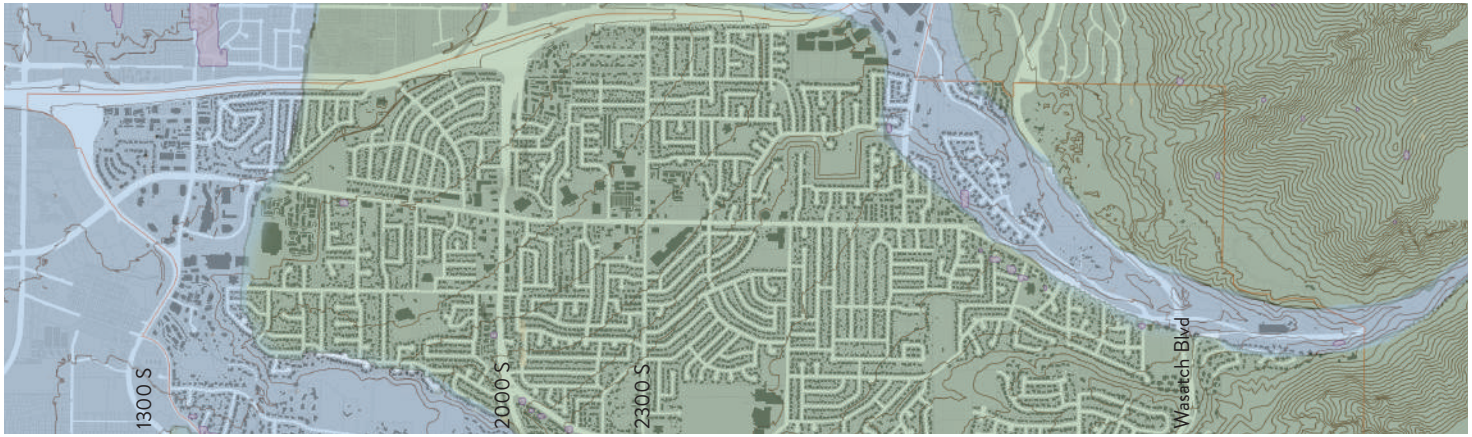
SEISMIC FEATURES

The specter of a massive earthquake influences construction in the Bonneville Valley. Cottonwood Heights is no exception. Several fault lines run through the westernmost edges of the city, especially in the gravel pit scheduled for redevelopment in 20-30 years. The majority of Fort Union Boulevard and the city escape the issues associated with building directly adjacent (or overtop) a fault line. The city also avoids a major concern of its municipal neighbors—liquefaction. Cottonwood Heights sits high enough on the Wasatch bench that its liquefaction risk is rated only moderate to very low.

IMPLICATIONS

- Several fault lines run under the gravel pit to the west
- Liquefaction is not a major concern in Cottonwood Heights

Drainage map of Fort Union Blvd: shows the waters movement from the canyon as it travels towards the Great Salt Lake. The natural flow provides Fort Union Blvd with the opportunity to better manage the water as it travels west by such practices as bioswales and permeable paving

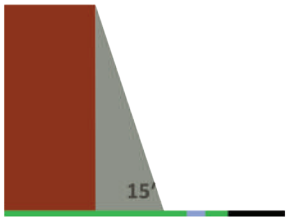


Low Liquefaction Risk

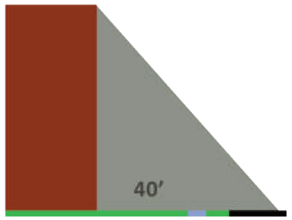
Moderate Liquefaction Risk

High Liquefaction Risk

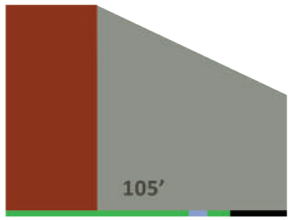
Liquefaction zone map for the area: a majority of the site rests in a low liquefaction zone. As the street moves west the risk increases to moderate



June 21 - Longest Day



Mar + Sept 21 - Equinoxes



Dec 21 - Shortest Day

Orientation: seasonal shadow lengths from a typical 3 story building to help determine building configurations that can include energy saving practices such as solar heat gain

ORIENTATION + CLIMATE

Cottonwood Heights has a semi-arid mountain climate. It experiences short springs and autumns with long summers and winters. Like all east-west routes in the northern hemisphere, attention must be paid to the interplay between the sun and the north-south built environment. North facing buildings could block sunlight for sidewalks abutting buildings. At 40 degrees north latitude, a three-story building will cast a shadow of different lengths during different seasons—15' shadow on June 21, a 40' shadow on March and September 21, and a 105' shadow on December 21 (calculated at 1pm for all instances). Fort Union Boulevard typically falls within an 85' right-of-way. This means that buildings on the south side of Fort Union could block sunlight on the northern sidewalk during some winter days. Since Cottonwood Heights has average winter temperatures in January in the low-to-mid 30's with snowfall, maintenance of sidewalks, cycle tracks, and roadways will need to include ice and snow removal. Summer temperatures in July average in the mid-to-high 90's, so shade will play a role in comfort all year. Trees or built structures of adequate height to walk and bike under could provide such shade.

Changes in temperature are expected to shift the climate in Cottonwood Heights. Average temperatures are projected to increase eight degrees Fahrenheit over the next 50 years. This has important implications for streetscape and development in the area. The economic and social activities associated with the snow industry will feel an impact. Warmer temperatures will shorten the ski season from six months to four months.

Extended warmer weather could mean increases in non-snow recreational uses of Big Cottonwood Canyon. As in Phoenix, people who live lower in the valley may seek the cool mountain breezes during the warmer months. Activities, industries, and lifestyles associated with recreations such as hiking, biking, fishing, and camping could play a larger role in the future of Cottonwood Heights. In addition to the social and economic shifts, environmental shifts will affect the water supply. Snowpack currently plays an important role in recharging the watershed that is Big Cottonwood Canyon. Shorter snow seasons will reduce the reliability of this municipal water source. Volatility will increase as the likelihood of drought rises. Not only are droughts more likely to occur, they are projected to be more severe. Storm events could be more severe as the total amount of precipitation could increase in the future.

IMPLICATIONS

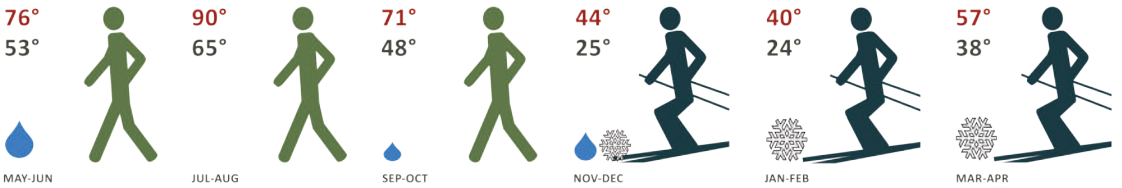
- Average temperatures will increase 8° F over the next 50 years
- Ski seasons will be shorter / summer will longer and hotter
- Shadows + shade will be more important to daily outdoor activity
- Instances of drought are likely to be more frequent and severe

VEGETATION

The climate and its projected changes impact vegetation choices. The USDA vegetation zone already shifted from 5b (1990, -15F to -10F) to 7a (2012, 0F to 5F). Trees planted in the near future will need to be able to survive in a 7b zone (5F-10F) as average temperatures rise within the next 25 years. The increase in droughts will also affect vegetation choice. Drought-resistant plants can reduce the costs associated with irrigating landscape. This also ties back into the drainage and built environment options mentioned previously. Choices in hardscape materials and design can promote healthy vegetation. This landscape can, in turn, promote a more inviting streetscape. Trees can provide shadow and shade for pedestrians, cyclists, and motorists. Deciduous street trees could provide much needed shade in the summer and allow ample sunlight in the winter. Plants decrease the ambient temperature, as well as clean the air. Ground cover, forbs, and other vegetation also decrease the heat-island effect of the street and city. Thus, vegetation serves more than aesthetics.

IMPLICATIONS

- Plant drought-resistant, urban-durable vegetation
- Select appropriate ground cover to reduce hard pavement runoff
- Provide deciduous shade trees that grow tall enough for people to walk under



Graphic representing the predicted changing annual climate for Utah : changes to the ski season, amount of overall precipitation received and rising temperatures are potential outcomes for the climate shift

GROUND COVER:
Snow-in-summer
H 1' x W 1'

GROUND COVER:
Damianita
H 2' x W 2'

VASE SHAPE TREE:
Frontier Elm
H 30-40' x W 20-30'

OVAL SHAPE TREE:
Legacy Sugar Maple
H 50-60' x W 30-40'

OVAL SHAPE TREE:
Sycamore Maple
H 50-60' x W 40-50'

Vegetation that will require less water and withstand higher temperatures will be needed along the street: Planning now for more drought resistant plant materials will ensure better longevity of the plants in the future. Additionally shade trees will play and important role in creating a pedestrian friendly street that is comfortable during the hot summer months

ROADWAY INFORMATION

RIGHT-OF-WAY

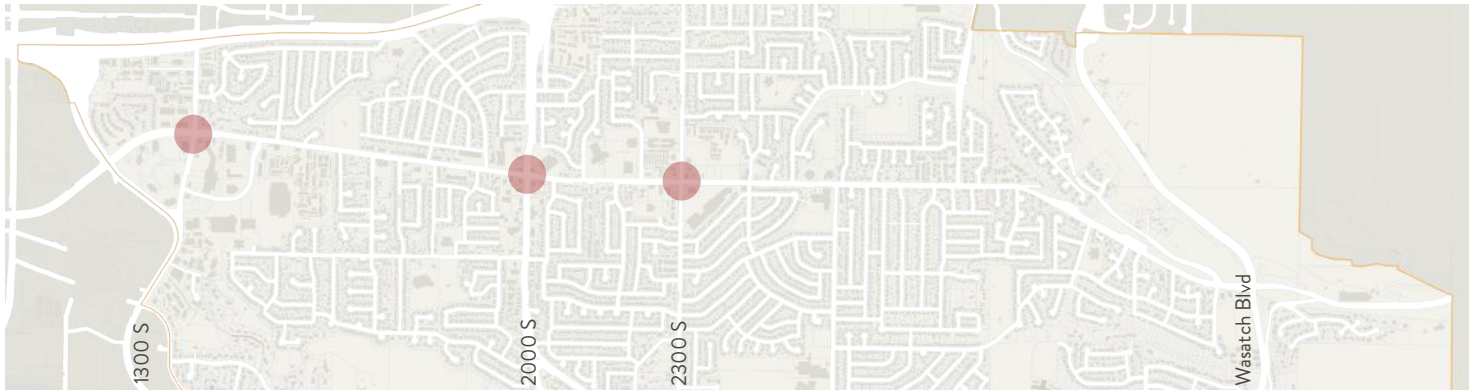
The current right-of-way along Fort Union Boulevard varies from very wide, measuring over one-hundred feet, down to a mere sixty feet across. The variations in the ROW occur primarily at the intersections where the streets widen for the creation of right and left turn lanes. After the intersections the road typically narrows down to roughly 75' to 85'. This variation in size plays a vital role as various transit options are explored for the city.

If the numbers of lanes are reduced in order to put the street on a "diet" there will need to be a consideration as to what would happen with the remaining space at the intersections previously occupied by lanes of traffic.

As an additional consideration, if transit options such as light rail are explored, there will need to be analysis as to whether the designated space needed for the trains can be accommodated in the current right-of-way. If a larger right-of-way is necessary, it will need to be determined how much would be required as takings and how this would impact the project economically.

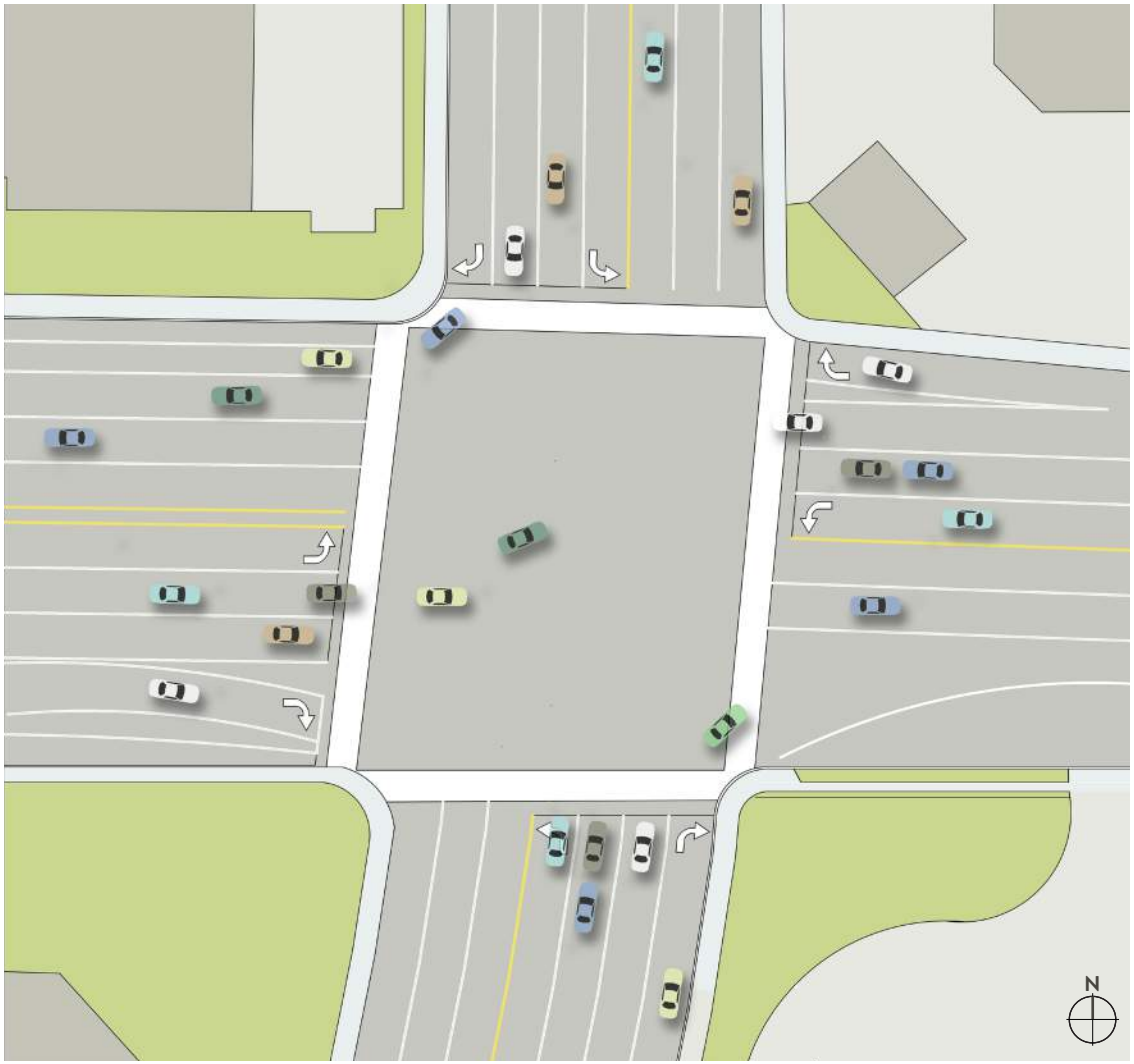
IMPLICATIONS

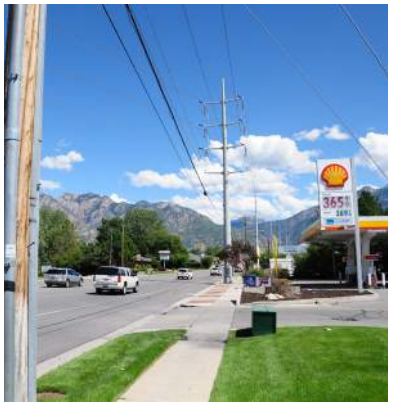
- Variations in right-of-way may determine what transit option will be viable for the street
- Intersections provide the largest right-of-way whereas the more typical street size narrows considerably and could be restrictive to some transit options



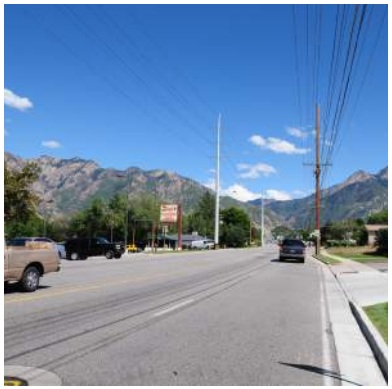
Intersection Locations: 1300 E, 2000 E, 2300 E

INTERSECTION 1 1300 EAST AND FORT UNION BLVD: Several lanes of traffic make this a highly visible intersection along Fort Union Blvd. This intersection represents the gateway for travelers coming from the west as they make their way up the canyon. These points make this intersection a prime location for future redevelopment and street improvement

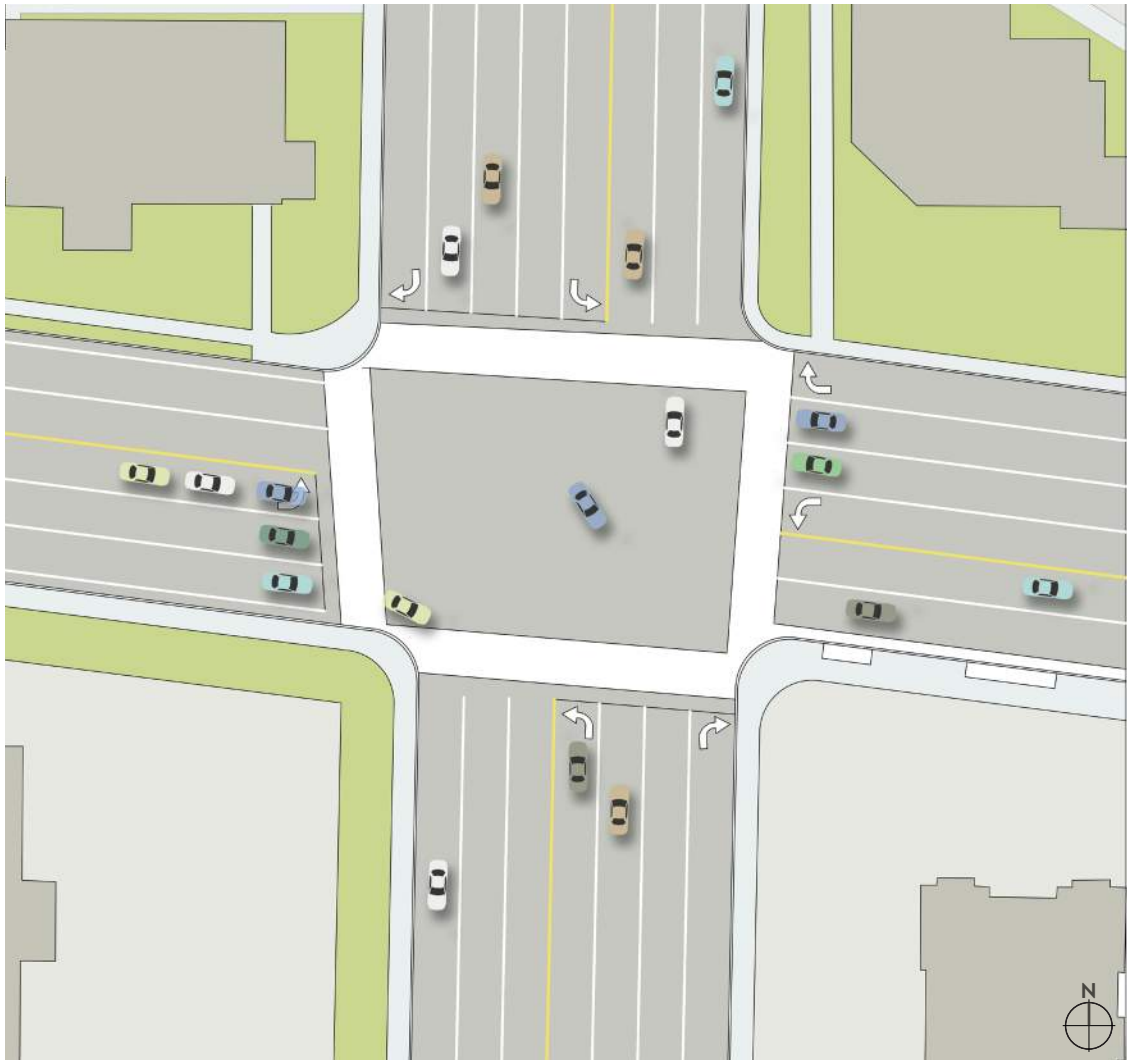




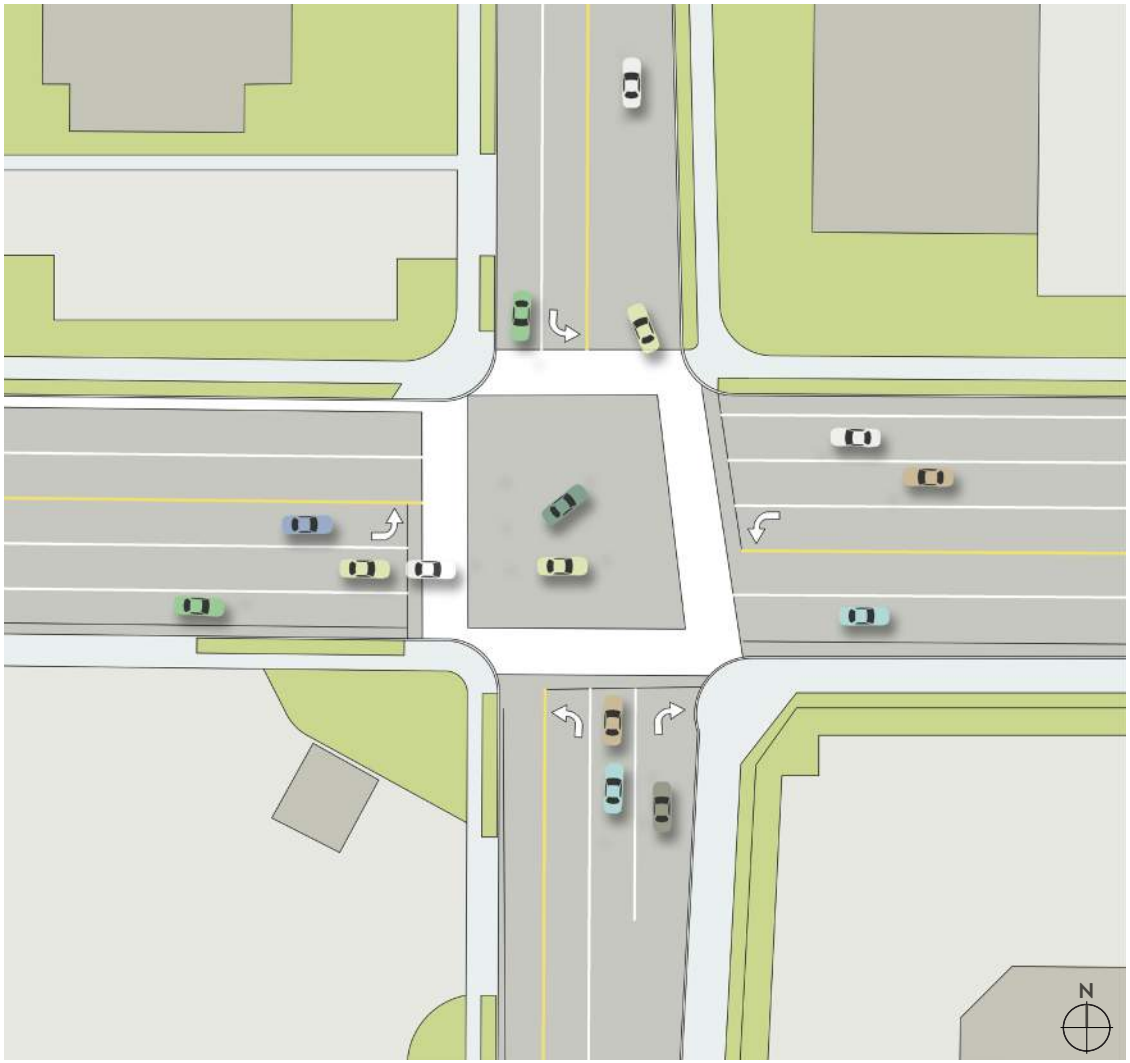
Observations 1300 E & Fort Union Blvd: Here the road is at its widest point (7 lanes). There is some landscaping, but this is limited to shrubs and lawn and there are not many trees. There is a bench at the bus stop, however it is exposed with no protection from the weather



Observations 2000 E & Fort Union Blvd: There are limited street trees creating a hot, unshaded walk. Some sidewalks are damaged and in need of repair. Homes along the south side of street could use curb appeal. Power lines are found primarily the south side of street. There is some street lighting, but no seating. The traffic noise is increasingly louder in this location



INTERSECTION 2
HIGHLAND DRIVE AND FORT UNION BLVD: Similar to the 1300 East intersection, the Highland Dr. intersection proves to be one of the larger portions of the street found along the corridor. This is attributed to the number of lanes and high use of Highland Dr. as an urban arterial



Observations 2300 E & Fort Union Blvd: Buildings could potentially be updated and, strip mall improved. There are some vacant buildings. Streetscape is limited; no benches, no pedestrian level street lights. There are underutilized parking lots with no landscape. The land use is single use area, retail only. The light at 2300 E provides safe crossing, however, there are no other crossings located nearby

INTERSECTION 3 2300 EAST AND FORT UNION BLVD: The road narrows considerably after traveling east from 1300 E. The configuration of this intersection represents the fairly typical right-of-way dimensions found along the rest of the street

New street and pedestrian lighting found near Highland Dr: The lights are the first pedestrian lights found on the street. A majority of the street is lined with cobra lights directed onto the roadway, so much of the sidewalks remain dark

Occasional mature trees appear along the street: There is no consistency to their spacing or type, therefore, no resonance is created. Likewise, there is little to no seating found along the street, including at the current bus stops

LIGHTING, SEATING + SIDEWALKS

There is currently a lack of vehicular and pedestrian lighting along Fort Union Boulevard. The vehicular lighting is concentrated at busy intersections. The lights at these few intersections are cobra heads, which add no aesthetic value to the road. There is no vehicular lighting around the neighborhoods located on the eastern end of the road. Pedestrian level lighting is almost nonexistent, which could contribute to the absence of pedestrian activity along Fort Union Boulevard. The only street lighting that is located at pedestrian level is in front of the Key Bank which was recently remodeled. This singular style of light is out of place, and does not contribute to the character of the street.

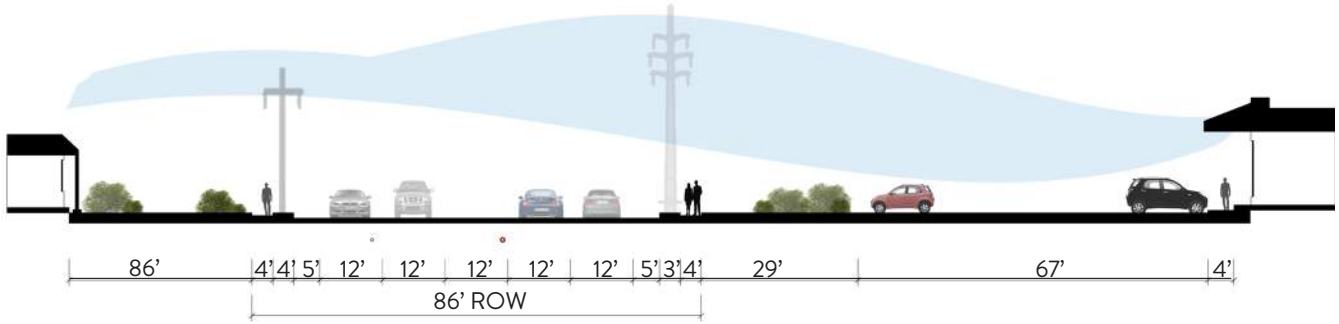
Adding additional lighting along Fort Union Boulevard would help contribute to the safety of pedestrians and bicyclists. The street would become more walkable and enjoyable for people living and visiting the area. There is also very minimal street furniture along Fort Union Boulevard. As the street continues from west to east the street furniture all but vanishes.

Along the western part of the road, bus stops have benches and occasionally a rubbish bin located nearby. Adding benches, rubbish and recycling bins, or newsstands would emphasize that the street is inviting to all modes of transit, including pedestrians. Benches and covered transit stops would also make riding the bus a more attractive option as this would provide people with a designated place to wait away from the weather. The city of Cottonwood Heights has done an efficient job of providing sidewalks along Fort Union Boulevard. Almost the whole roadway is lined with five foot sidewalks. These are not being utilized because of the lack of the other amenities that were previously discussed. The majority of the current sidewalks are in decent condition. The sidewalks located on the northern side of the street could be repaired, as they have cracks and some damage from tree roots growing through them.

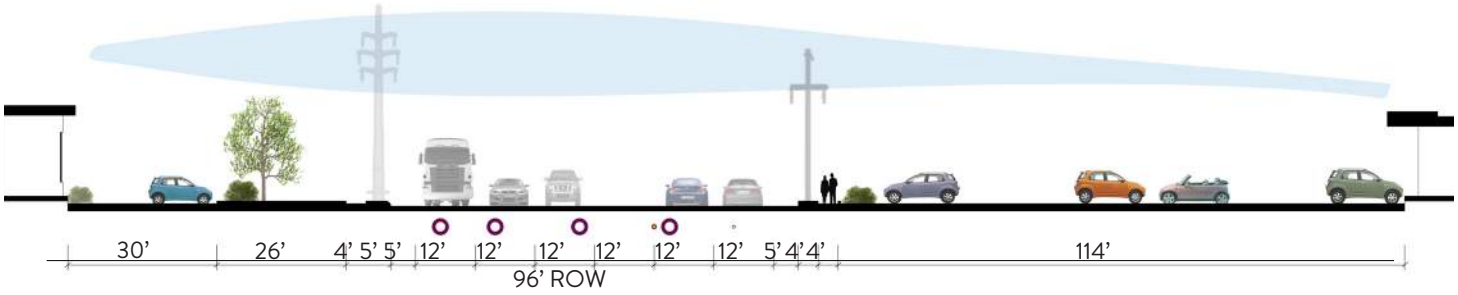
IMPLICATIONS

- The lack of pedestrian and vehicular lights causes safety issues along Fort Union Boulevard
- The addition of street furniture would increase the overall pedestrian use of the street
- Sidewalks improvements, such as repaving or widening would increase pedestrian activity allow for greater activity

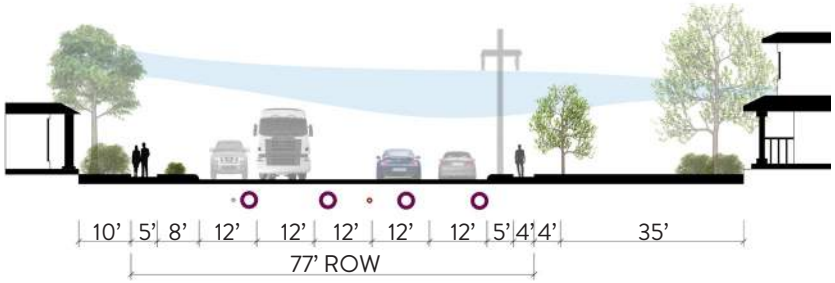
Sections of Typical Conditions on Fort Union Boulevard



Section 1 West of 1435 E & Fort Union Blvd: The western boundaries of the site have the least amount of underground utilities, providing less constraints for retrofitting the road



Section 2 Near 2300 E & Fort Union Blvd: The Right of Way width is somewhat constrained, however, due to the large setbacks from the street edge, the road appears to be much larger



Section 3 East of 3300 S & Fort Union Blvd: The Right of way maintains a fairly consistent width ranging from 70’-80’ through most of the corridor, this range can inform what are the viable types of transportation options for the street

Power pole along the street: Currently much of the street is lined with large power poles. These poles dominate the visual aspect of Fort Union Blvd. Finding a way to underground or reduce the poles will help improve the quality of the street as well as allow for more street trees to be planted without possible interference with the lines

SETBACKS

The current building setbacks on the street create a limited sense of enclosure along the boulevard. The road itself is not necessarily wide at times; however, because of large setbacks filled with lawn and parking lots the visual expanse of the street is greatly expanded. This vast space can be visually arresting and does not provide an attractive aesthetic quality to the street. Additionally, a lack of resonating street trees also contributes to the feeling of empty space along the street. The street is not currently void of trees or vegetation, however, there is not an established street tree pattern and the current trees are too sporadic to influence the sense of enclosure on the street. This apparent lack of street wall makes the street unfriendly to pedestrians and to vast for a comfortable human scale.

IMPLICATIONS

- Lack of buildings lining the street does not create a strong street-wall and reduces the visual quality of the boulevard
- Large parking lots line the front of the buildings, giving dominance to the car and creating unsightly frontages
- If building placements cannot be altered, additions such as street trees can help in creating a feeling of an enclosed street wall and improve the visual quality of the street

POWER POLES

The first thing you notice as you are driving or walking along Fort Union Boulevard is the enormous amount of power poles that line the street. The two types of poles are the tall metal regional transmission lines, and shorter wood local reticulated lines. The grey poles are located primarily on the south side of the street and are approximately 60 feet in height and four feet wide at the base. Fortunately, the smaller wooden utility poles that are located mostly along the northern side of the street can carried over to the regional tower poles. The window of design possibility has been opened up with the potential removal of the wooden poles. Street trees could be planted where these poles currently stand, and the line of sight would be directed elsewhere.

IMPLICATIONS

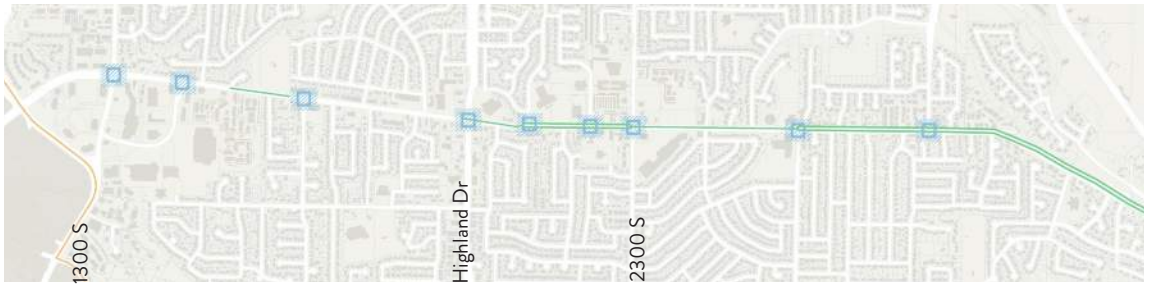
- The tall metal regional transmission lines must be accounted for in any design, as it is too expensive to relocated them underground
- The smaller wooden utility poles located on the south side of the street can be connected to the grey utility poles on the north side

CROSSWALKS

Fort Union Boulevard is a main thoroughfare for the city of Cottonwood Heights. It is rarely used by pedestrians. One reason for this is the lack of pedestrian crossings along the west to east route. Pedestrians have to walk at least a quarter mile to reach an official crosswalk. These crosswalks are usually located at main intersections, and are rarely mid-block. The only crosswalk that is mid-block is located near an elementary school, which is the only means to allow the children to safely cross the road. The few pedestrians that walk along Fort Union Boulevard must illegally cross the street at undesignated points. This is an unnecessary safety hazard for not only the pedestrian, but for automobiles along the road. The addition of crosswalks along Fort Union Boulevard would greatly increase the safety of the citizens of Cottonwood Heights. The road would become inviting for pedestrians and would increase walkability with the addition of crosswalks.

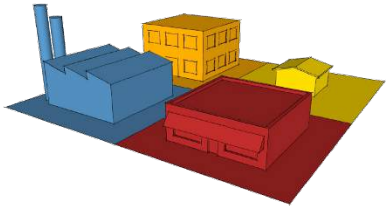
IMPLICATIONS

- There is a severe lack of crosswalks along Fort Union Boulevard
- The only crossing that is not at an intersection is by the elementary school
- Mid-block crossings would increase walkability and pedestrian safety along Fort Union Boulevard

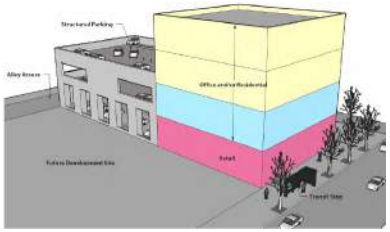


A map of all designated crosswalks found along Fort Union Blvd: As a whole the crosswalks occur at intersections with traffic signals. There are significant gaps between these same crossings and moving from one side of the street to the other proves to be difficult to pedestrians

Maps to provide the locations of all of the power poles along Fort Union Blvd: The purple and maroon dots represent the larger poles. As the street moves east the poles gradually become smaller and found more on the north side of the street



Euclidean Zoning has separated land uses in Cottonwood Heights: These separations have created a divide between retail, residential, and work spaces. The car becomes the dominate form of transportation to connect these uses and parking lots become larger to meet the demand of increasing vehicles.



IDEA Mixed-use proposals create more walkable communities: With multiple uses combined the vehicle's importance is reduced and the pedestrian is able to access many uses in a smaller space and within a walkable distance

EXISTING LAND USES

After the zoning for the city was reviewed an analysis of the existing land functions was created. The residential zones are divided based on several factors including size of plot and size of housing unit. They range from rural residential to multi-family residential. Similarly, the commercial and office zones have varying degrees and requirements. Some city-wide zoning policies play a more important role in redevelopment than others. For example, the set back from the street ROW and the maximum height of the building play a key factor in overall density. A restriction of 35 ft tall buildings is currently in place.

If any of the various transit modes which are being evaluated for the city are adopted, then higher density development will be needed to support transit ridership. Most of the proposed transit options require higher density around the transit corridor and would require upzoning in these areas.

IMPLICATIONS

- For any significant change to occur around the street current zoning practices must be altered
- Options such as Planned Unit Developments (PUD) or Form Based Codes will allow for better development that is more pedestrian focused

REDEVELOPMENT OPPORTUNITIES

Ample Parking

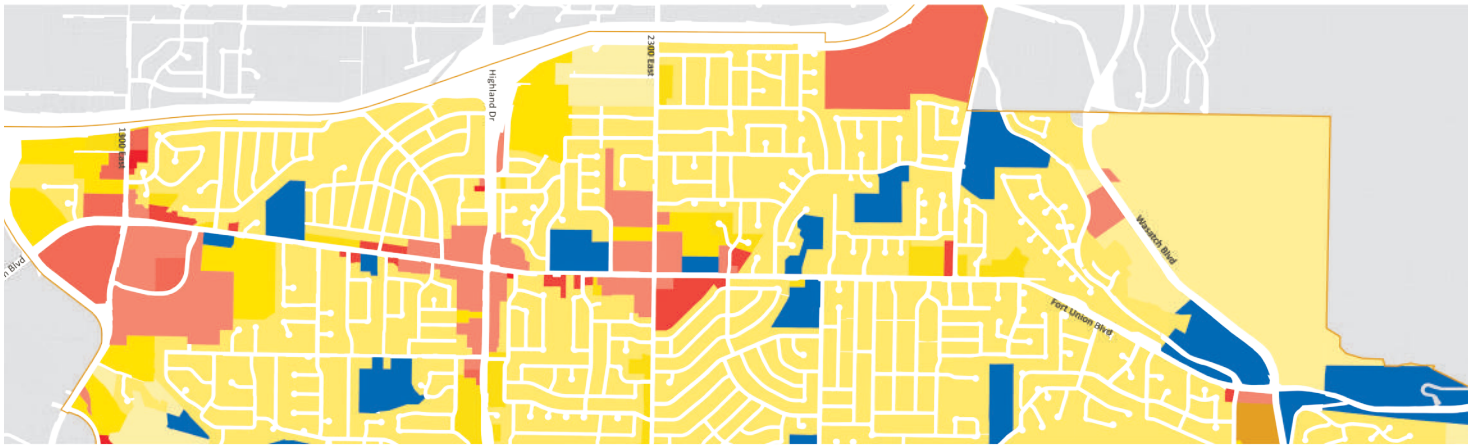
Empty Buildings

Space for Lease

Strip Malls

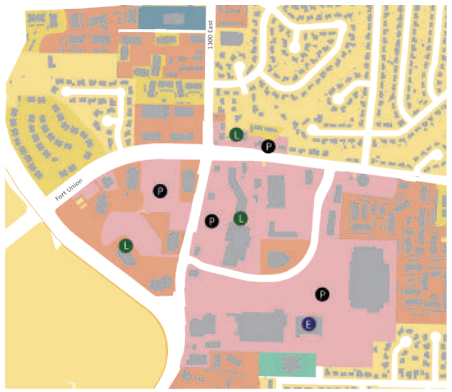
Tear-downs

Vacant Land

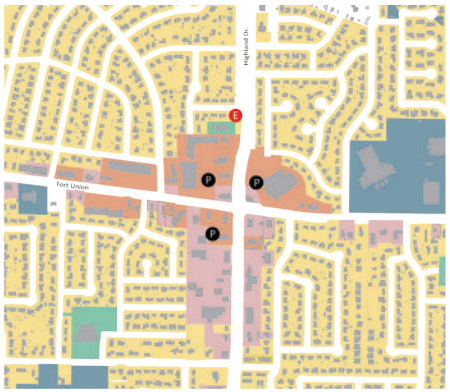


- Rural Residential
- Single Family Residential
- Multi-Family Residential
- Regional Commercial
- Office
- Neighborhood Commercial
- Residential Office
- Mixed-use
- Foothill Occasion
- Public Facility

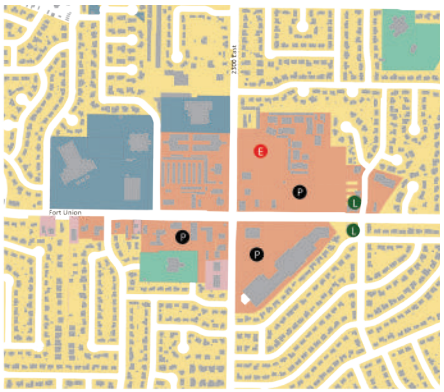
Current land uses surrounding Fort Union Blvd: Much of the current office and commercial use for the city is situated along the Fort Union street corridor



Land Use 1300 East, Fort Union Blvd: Node is primarily commercial and office uses. The distances between these uses are vast and not conducive to walking



Land Use Highland Dr, Fort Union Blvd: Commercial uses are somewhat easier to access by foot as compared to 1300 East



Land Use 2300 East, Fort Union Blvd: Large parking lots provide extensive development opportunities for this location

- Commercial
- Office
- Institutional
- Religious Institutions
- High Density Residential
- Residential
- P — Large Parking
- L — For Lease
- E — Empty Lots
- E — Empty Buildings

The street corridor has several lots identified as a single land owner: Areas with one land owner, such as at 1300 E as well as 2300 E are optimal for redevelopment

OWNERSHIP

Consideration of the ownership of parcels was given in order to help better understand the redevelopment potential of the Fort Union corridor. The size and type of development corresponds to the size of the parcel that the development would be on. Large parcels were identified in the three major commercial nodes at 1300 East, Highland Drive (2000 East), and 2300 East.

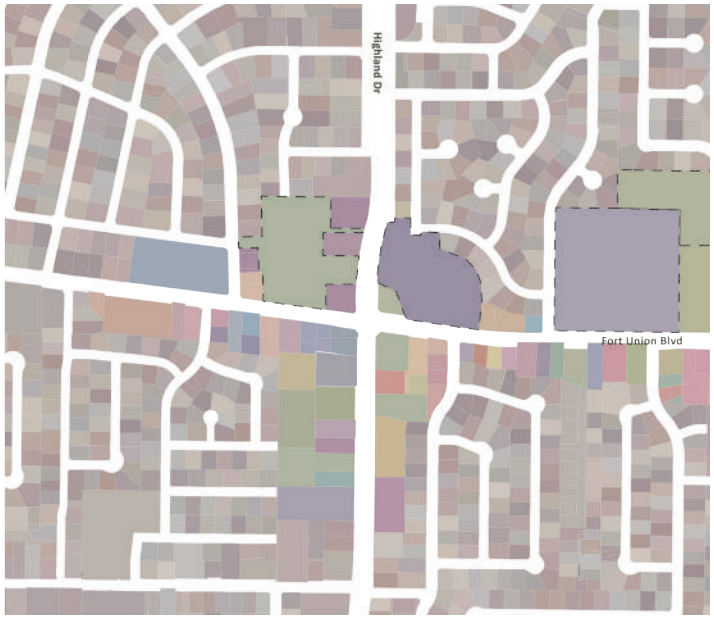
Land ownership begins to play an integral role in the process of future development. Large projects that encompasses land that involves many owners can be difficult to navigate. In these circumstances infill or smaller development may be more feasible. In large commercial areas with only one or two landowners the process for major redevelopment projects becomes feasible and easier to negotiate.

IMPLICATIONS

- Find large areas with one land owner for large scale redevelopment projects such as Lifestyle Centers
- Smaller parcels serve well for infill development

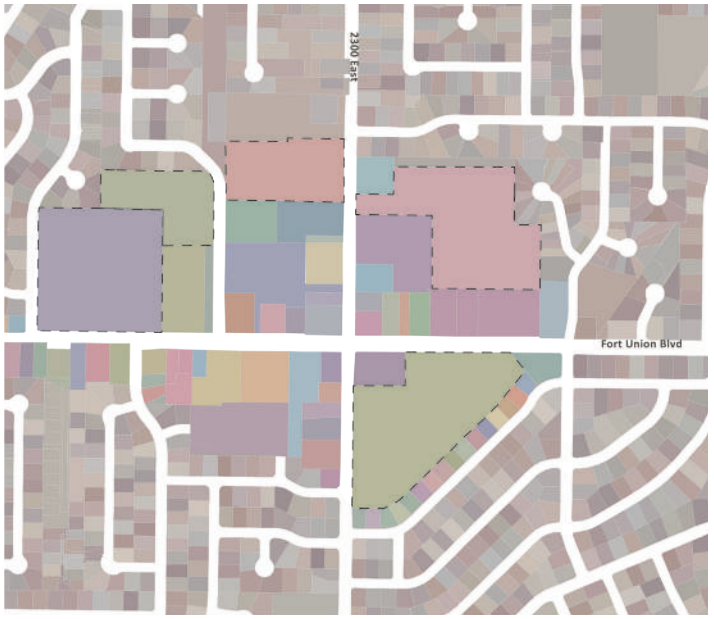
1300 EAST + FORT UNION BLVD

The land situated around the 1300 East intersection provides a key opportunity for redevelopment. The large parcels owned by a single land owner allows for parking lot infill or completed redesign in order to improve the spaces. Density and uses can be improved and help to create a more vibrant town center



HIGHLAND DRIVE + FORT UNION BLVD

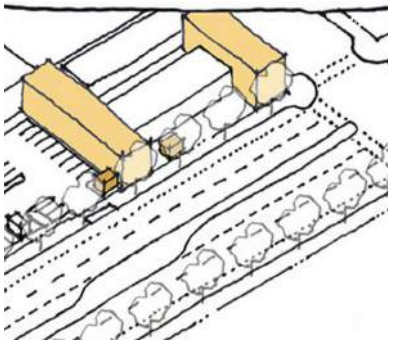
The size of the parcels and multiple owners around the Highland Drive intersection means change may be smaller scale and more incremental over time. Small changes such as infill to parking space or in the building setback spaces could be the solution for this area



2300 EAST + FORT UNION BLVD

Similar to 1300 East there are some large parcels with one land owner that are opportune for redevelopment. Having a catalyst site like that can help to encourage surrounding land owners to be part of a larger development project

IDEA Sizable parcels with one land owner allow for easier large scale development: A lifestyle center or mixed-use district can be achieved in areas such as 1300 E or 2300 E



IDEA When large parcels of land are not available, small infill projects are a possible solution: parking lot infill projects on small sites can have a big impact

TRAFFIC AND TRANSIT VOLUME

CAR-CENTRIC STREET

VS

BICYCLE FRIENDLY STREET

IDEA Car-centric streets are less economically viable: streets that cater to cyclists have better property values and sell for an average 11% more. A study in New York found that a street that catered to cyclists performed considerably better than the car-centric streets. The bike friendly streets that had cycle tracks and large sidewalks had 49% fewer commercial vacancies. The businesses also reported up to 49% increase in sales. Finally, it was found that those arriving by bike spent considerably more then those arriving by car

TRAFFIC AND TRANSIT VOLUME

According to Average Daily Travel (ADT) information, volumes along Fort Union Blvd are projected to increase over the next 20 years. According to the 2010 Highway Capacity Manual, a two lane road with a center left turn lane has a capacity of 16,000 vehicles per day, and a four lane road with a left turn lane has a capacity of 31,000 vehicles per day. Fort Union Blvd has four lanes of traffic from 1300 E to 3000 E which reduces to two lanes from 3000 E to Wasatch Boulevard. This means unless additional capacity is added to the road, congestion and vehicle delays will likely become worse. However, increasing road capacity by adding lanes is not necessarily the best solution for the city's future traffic problems. Studies have shown that widening roads and adding travel lanes induce people to drive more on the road than projections indicate, and are not as beneficial to reducing traffic as originally desired. Increasing capacity will temporarily alleviate congestion, but will make the street less friendly to pedestrians. Keeping the road configuration as it is now might be better for pedestrians, but congestion will likely be worse.

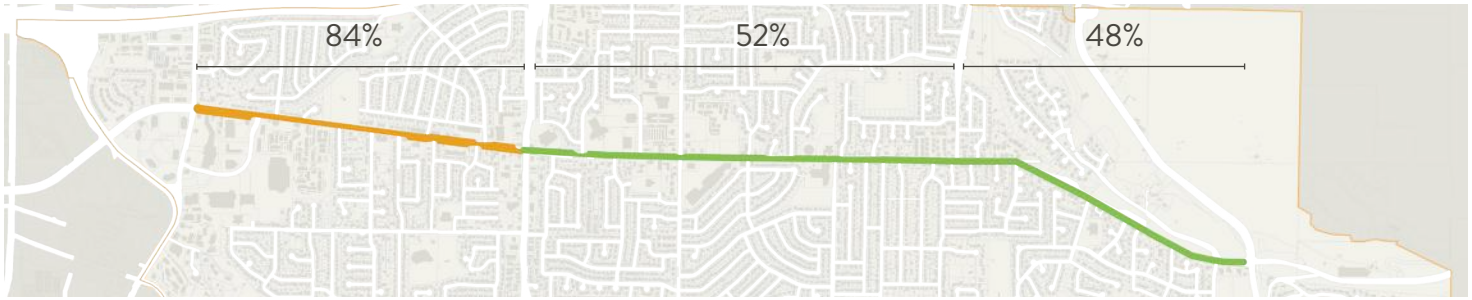
IMPLICATIONS

- Traffic volumes will increase in the future
- With current road capacities, Fort Union will experience more congestion and vehicle delays
- Increasing capacities will provide temporary traffic relief, but will likely have negative impacts to pedestrians

Road Segment	Year 2011	Year 2020	Year 2030
1300 East to Highland Drive	26,010	32,010	38,000
Highland Drive to 2300 East	16,220	21,110	26,000
2300 East to 3000 East	16,220	20,610	25,000
3000 East to Wasatch Boulevard	7,730	12,370	17,000

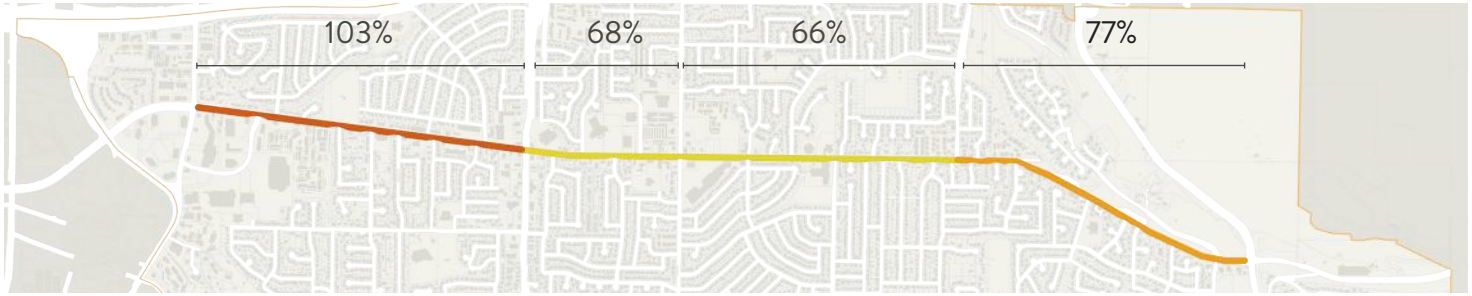
Projected Average Daily Traffic figures: These numbers represent the estimated total number of daily traffic expected along different sections of Fort Union Blvd over the next 15-20 years

A visual comparison: the same number of people that fit in a city bus as compared to cars and bicycles and the space required for each



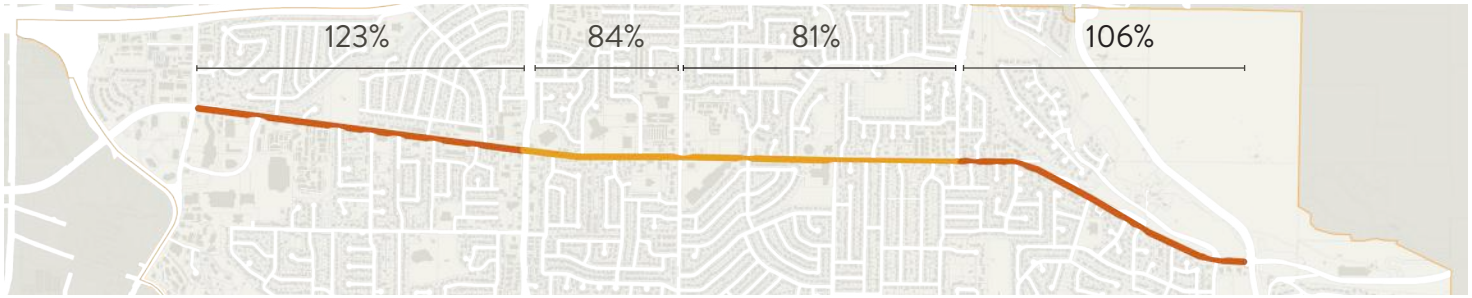
2011

2011 Average Daily Traffic Capacity Utilization: Currently Fort Union Blvd has the ability to adequately meet current traffic patterns and has excess capacity to handle traffic



2020

2020 Average Daily Traffic Capacity Utilization: According to projected Average Daily Traffic analysis, over the next 20 years traffic volumes will increase and maximize existing road capacity



2030

2030 Average Daily Traffic Capacity Utilization: Increasing capacity will temporarily alleviate congestion, but will make the street less pedestrian friendly

N

1 Mile

IDEA Transit Oriented Development: could provide a means for residents to live and work in Cottonwood Heights as well as provide a solution for projected traffic congestion

EXISTING TRANSIT

While Fort Union has seven bus routes that cross through the city, the city is underserved by transit because most of these routes only run during the peak commuting times. Only three routes: 72, 213, and 220, have regular service throughout the day. The rest of the routes are either ski buses, or "fast" commuter type buses. These buses only run during the morning and evening. What this means is that there is a definite need for increased transit to serve the city. Having more transit options will decrease citizens dependence on automobiles, and will give residents more options when it comes to getting around.

TRANSIT AND EMPLOYMENT

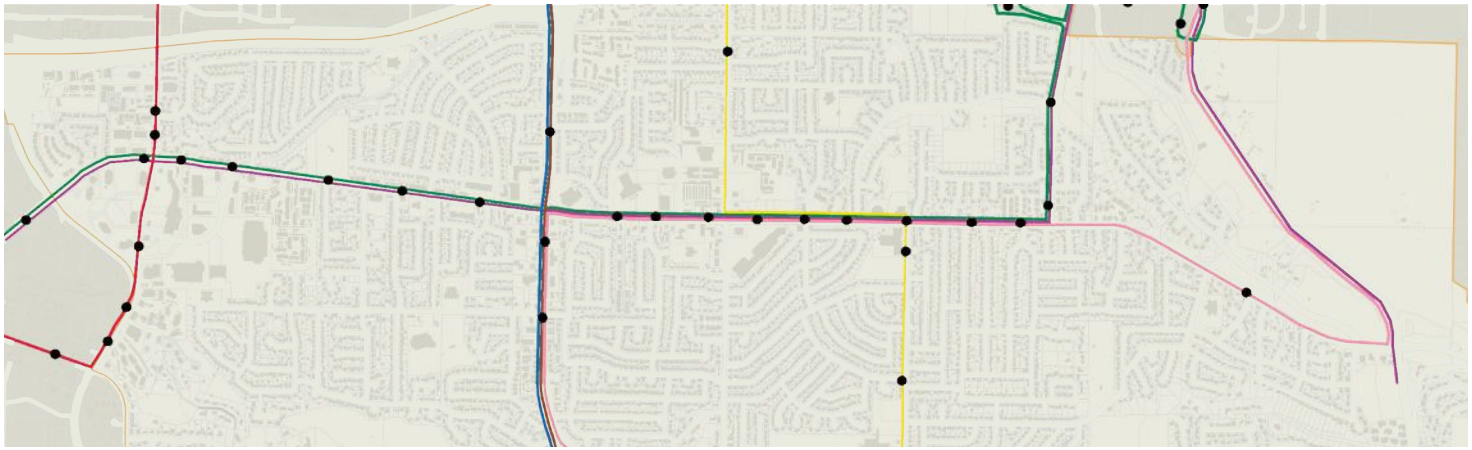
From census data it was found that most residents work fairly close to the city. 58% of city residents work within 10 miles of city boundaries, 86% work within 25 miles, and 96% work within 50 miles. What this means for the city is that increasing road and transit connections to just the areas immediately surrounding the city will substantially increase access to existing job sites.

TRAVEL TO WORK

Most people who live in Cottonwood Heights work outside the city, and most people who are employed in Cottonwood Heights come from outside the city. According to census data, of the city's 16,577 jobs located within the city, 15,283 are filled by people who live outside the city. Of the 16,505 jobs that city residents hold, 15,211 are located outside the city. Only 1,294 jobs are filled by people who live and work in Cottonwood Heights. What this means for the city is that there is a job imbalance in the city. People travel outside the city to travel to work, while jobs inside the city are filled by people from other cities. Opportunities exist for city residents to find work within their own city. Increasing the number of jobs in the city that are filled by local residents would help improve city traffic, and allow for shorter trips to and from work.

IMPLICATIONS

- Cottonwood Heights is only served by 3 bus routes
- Increasing transit opportunities will decrease automobile use, and provide more options
- Increasing connectivity to adjacent areas will increase job access
- People who live in Cottonwood Heights do not work in the city
- Some people who are employed in Cottonwood Heights come from other communities
- Increasing city jobs that are filled by city residents are good for the city

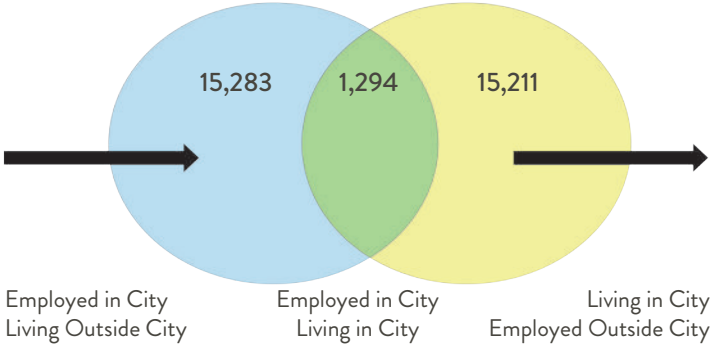


72 7200 South
213 1300 East/1100 East
220 Highland Drive/1300 East
990 7200 South to Snowbird Alta
320 Highland Drive Fast Bus
354 Sandy/U of U Bus
Cottonwood Heights Fast Bus
Stops

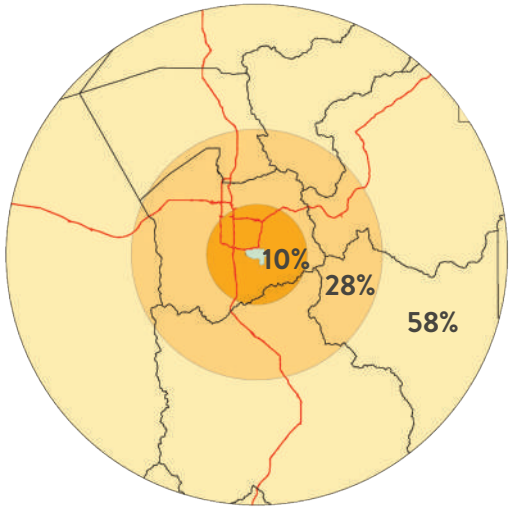
N

0 1 Mile

EXISTING BUS LINES AND STOPS



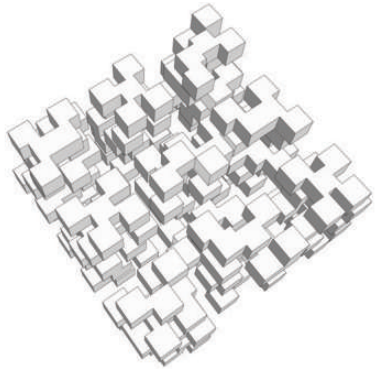
JOB FLOW



Cottonwood Heights
10 Mile Radius
25 Mile Radius
50 Mile Radius

0 30 Miles

DISTANCE FROM HOME TO WORK



IDEA Course grained spatial growth vs fine-grained spatial growth: The more 'fine-grained' and varied the built environment, the better the spaces function for people. Likewise the more "fine-grained", the more aesthetically pleasing the city becomes

MORPHOLOGY

MORPHOLOGY + PLACE QUALITIES

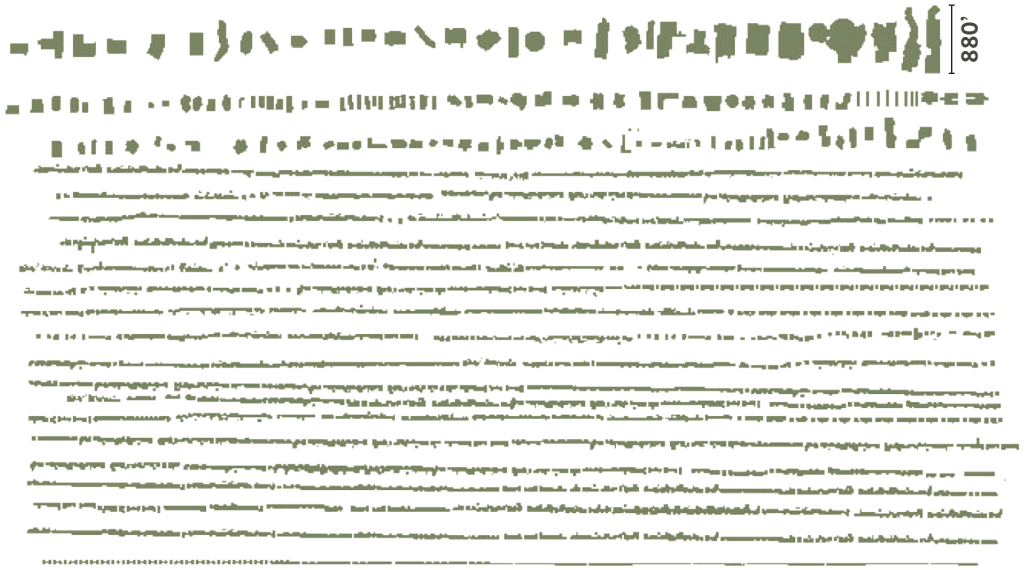
Morphology by definition is the study of form. In urban design practice this becomes the study of a very specific set of spatial characteristics that help us to understand how a place is structured by key elements. An often overlooked element of morphology is the impact that form has on substantive users, residents and visitors to any geographic location. A mantra reinforced in Utah's urban theory course goes like this: Place is space with meaning. Q: What happens when there is little revered meaning to a place? A: PLACELESSNESS. Placelessness is a phenomenon of mid- to late-20th Century industrialized economies. It has come about due to the standardization of city design elements, such as: universal engineering standards for streets, stripped down architectural styles, franchised outlets, risk aversion in real estate development, and profit seeking in the property market, to name just a few. Placemaking on the other hand has become a key strategy in economic development, city branding, public realm design, imageability, memorability, and new retail experiences.

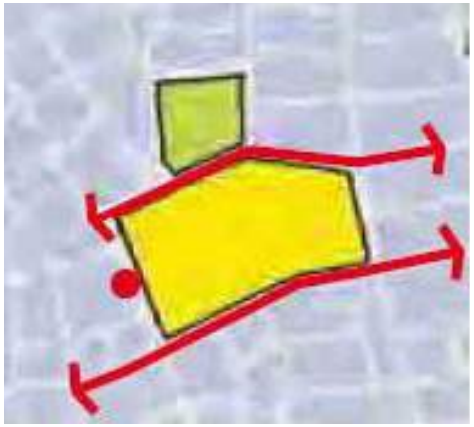
THE STREET NETWORK

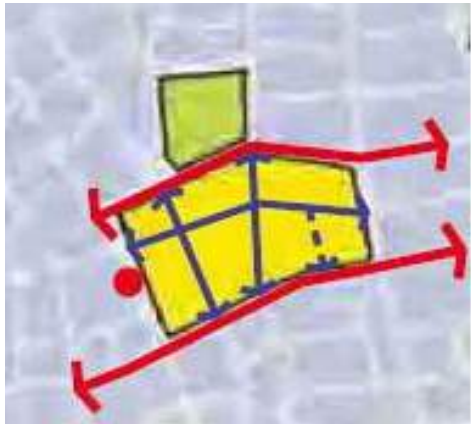
Cottonwood Height's street network can aptly be described as 'bifurcated.' Two predominant street types exist in the city: the urban arterial and the local access road found in residential neighborhoods. A handful of urban arterials provide the backbone to the City's street network. In the north to south direction a 'ladder' of streets segments the city into relatively equally sized land tracts. 1300 E, Highland, 2300 east and 3000 east. On the eastern edge of the city, Wasatch Boulevard is also akin to these north-south arterials streets. In the east-west direction, the City is served by two roadways, Interstate 2215 to the north of the city, and unsurprisingly, Fort Union Boulevard. This dearth of arterial and collector streets in the east-west direction suggests why Fort Union Boulevard is so frequently congested...there simply are no other east-west movement choices in the city. Fort Union is the default "bottleneck" if you will.

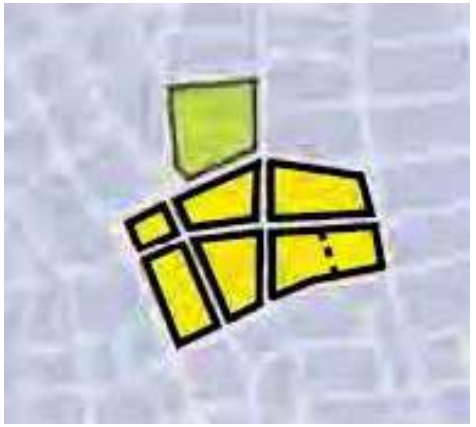
THE URBAN FABRIC

For the most part, Cottonwood Heights is a low-slung city with little sense of structural hierarchy. The City is primarily characterized by one story and two story buildings, save for a few nodal clusters of taller buildings. Three different scales of building exist in the city. The largest buildings (coarse grain development) are located along Fort Union Boulevard and along other key arterials, and are indicative of late-20th Century retailing practices: large floor plate big box establishments, supermarkets, strip malls, and a few office blocks. Also in this category can be found large institutional buildings such as high schools and medical facilities. A mid-grain category can be found on most arterial streets in the form of moderately sized retail establishments, such as pharmacies, auto support industries, mixed-use buildings, and larger restaurants. For the most part, Cottonwood Heights has a fine-grain urban fabric, consisting largely of single-family detached housing units, set in a low-density large lot





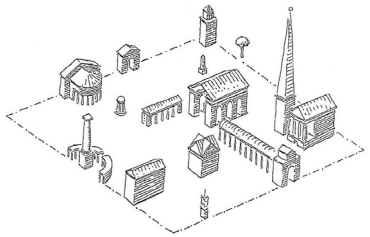




The above image is an arrangment in scale of the buildings that make up the city: the buildings are arranged from the large commercial structures down to the small residential units. This demonstration shows the structures that currently make up the urban fabric

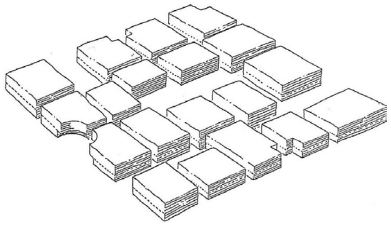
IDEA Improving the urban fabric by creating a more pedestrian friendly approach: by linking existing and proposed streets and access to transit, the street pattern then forms a more quality circulation that ensures buildings contribute positively to the public realm

Landmarks, Institutions



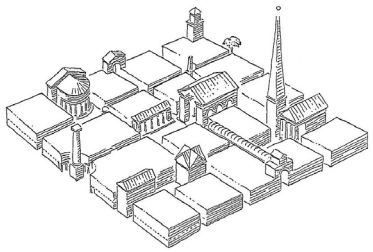
+

Residential, Everyday Fabric



=

The True City



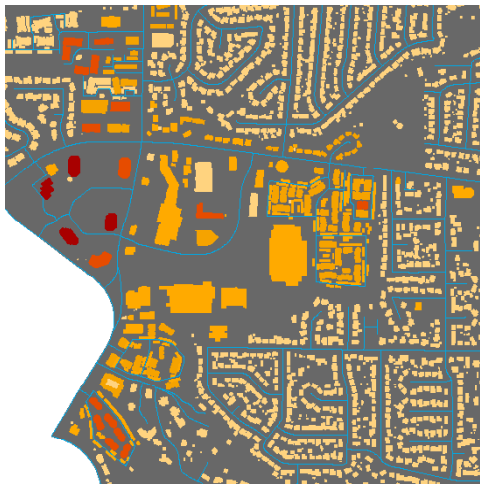
circumstance. A trend in most cities of the sunbelt and inter-mountain west is the increasing coarseness of grain of retail establishments, medical facilities supermarkets, and other types of 'category killers.' This growing coarseness of grain (coupled with streets devoid of comfort), often results in an unwalkable, uninviting, and often empty urban street life.

SPATIAL RELATIONSHIPS

Typical of the urban arterial problem described earlier is the poor sense of relationship between functional elements to create spaces (and places) that provide a sense of interiority, enclosure, comfort and safety. Two key spatial relationships are deserving of critique here: 1. The relationship between buildings and the right-of-way edge; and 2. The proportional relationship between building heights and street widths. But first a few pointers about valued urban places. Around the world, the most valued and loved urban places are those that provide a good sense of enclosure of the street wall around a public realm space. Think here of the Place des Vosges in Paris, the Piazza Navona in Italy, or just about any Latin American zocolo. All of them have consistent street walls with very little 'leakage' of space. These places become outdoor rooms, replete with all the accouterments of the finest interior spaces: plentiful places to sit, tables for lunch or coffee (rather than laps), comfortable temperatures or the ability to adjust furnishings to desired light and heat levels, and some sense of ceiling structure. In Cottonwood Heights, the setbacks of buildings beyond the street edge create a type of "no man's land" where few people want to be. These spaces are typically used for asphalt car parking. A second spatial relationship that fails on Fort Union Boulevard is the relationship between building heights and right-of-way widths. With seas of parking intervening between building edge and street edge, the necessary proportional relationship is non-existent.

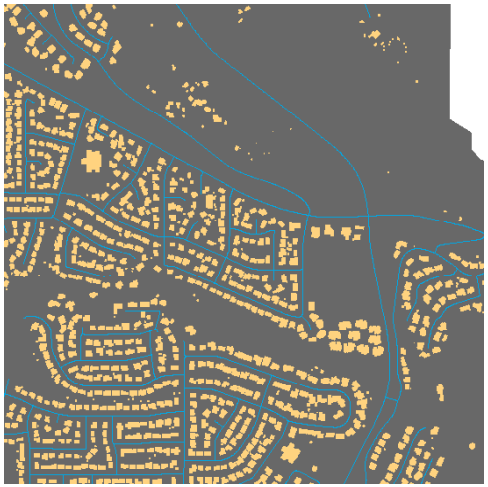
PLACE QUALITY

The visual quality of urban arterials and other retail developments in Cottonwood Heights, produces a mixed bag of experiences. Students working on this project consider Fort Union Boulevard to offer a rather placeless experience, similar to many other urban arterials around the country. The same can be said of the strip malls, big box parking lots, supermarkets, and franchised outlets. None of these contribute to any sense of place. This then becomes a goal of the studio project, to infuse the City with new place character, materiality, hardscape materials, appropriate vegetation, trees that bring year round color to the City, groundcovers, and new furnishings that might contribute to a higher quality of life. Another challenge for the studio, is how to match any new place-making strategy with the sustainability challenges that might make the city more resilient.



Fort Union Blvd +
1300 E

Fort Union Blvd +
Highland Dr



Fort Union Blvd +
Wasatch Blvd

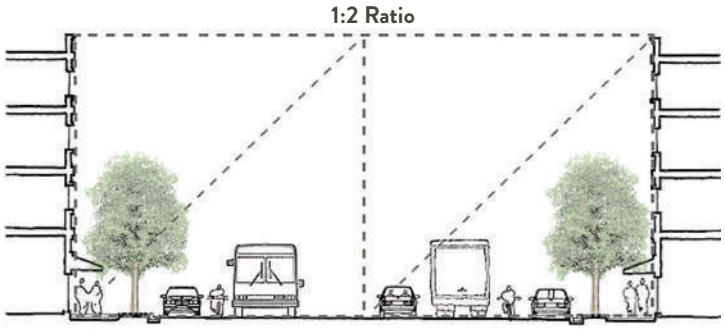
HEIGHT OF BUILDINGS IN COTTONWOOD HEIGHTS

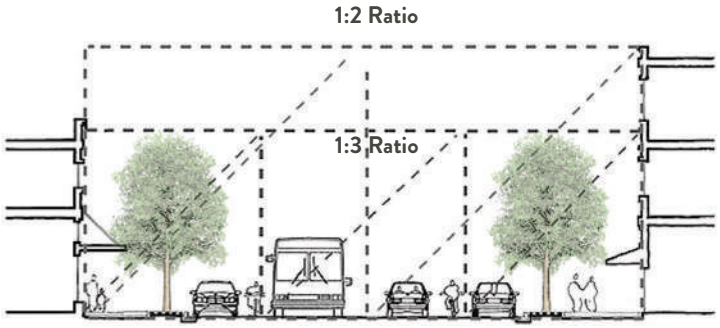
- 1 Level
- 2+ Levels
- 3-4Levels
- 5Levels
- 6+ Levels

N

An analysis of the building height of the city shows a relatively low, homogeneous structure: A majority of the buildings are single family residential units. The buildings that surround the intersection nodes are still relatively low. The density of the nodes would improve if building heights were increased. Likewise the higher density would help support any future transit alternatives

Building Height and Thoroughfare Enclosure





IDEA Improving the street with increased building height and proximity to street: buildings are one of the primary features of the urban form that can create a sense of definition and enclosure on a thoroughfare. This ratio is essential in creating a space that is comfortable and attractive for pedestrians. Street trees may be used to provide definition and enclosure as well

A collage of images depicting the overall impression of Fort Union Blvd: The street feels large and lacks identity. The buildings are dated and unattractive. The amount of parking surrounding some of the buildings is overwhelming and dominates the look of the area

THE VISIONING EXERCISE

VISIONS AND DESIGN PRINCIPLES DEFINED

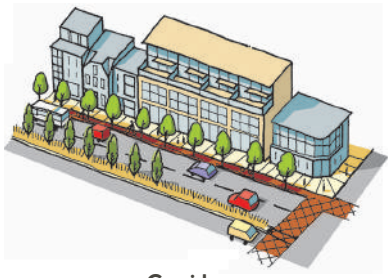
The Urban Design Studio meets with city staff to discuss the problems of Fort Union Boulevard: the students presented their findings and visions for the city, both for transit and development, throughout the Fall 2013 semester

The Cottonwood Heights Streetscape, Transit and Redevelopment Proposals presented in this monograph are based on a process of facilitated vision building, which is then augmented by a series of design principles that are embedded within each vision statement. Public realm visions depict a narrative future that embody the spirit and desired direction of a place by its people, facilitators, stakeholders, and project team members. They must be firmly rooted in place-based realism – the cultural, environmental, social and economic identities of the place, city, state and nation. Visions must be precisely conceptualized; they must be clear and unambiguous; they must be memorable and inspirational. To be successful, a vision must be easily articulated, communicated regularly, and creatively illustrated to demonstrate how it might be realized. To be visionary, the City should help the area become what it is destined to become from the assets and seeds that are currently available there. For visions to be achieved they need to be carried forward and owned by those with the power to affect change, while concurrently bringing along those who would adopt and craft the realized vision through their personal interpretation. Vision building is inspired understanding, enlightened marketing, and innovative place-making. Vision statements should become active policy vehicles for future development decisions.

Creating a public realm and transit vision for Cottonwood Heights and Fort Union Boulevard must incorporate insight into its future role in creating a more sustainable, resilient, and livable street experience for all public realm users, beyond and including those with private vehicles. These visions cannot be "pie in the sky" dreaming, but must also address current and future challenges. The vision statements articulated in this chapter are based on the belief that Cottonwood Heights and Fort Union Boulevard can become more than the sum of its current functions; that it can become a catalyst for reimagining the city and its public realm; that it can help the City achieve a level of sustainable and resilient development that might be unattainable if status quo transportation and road planning practices continue unabated.

Whereas vision statements are policy depictions of a desired future, design principles, on the other hand, are used to educate readers and stakeholders to ideas that should be followed in carrying out the vision. Design principles should be embedded under specific vision statements within the larger vision plan. Rather than suggesting vision-based goals, they should educated implementers, developers, and beneficiaries about ideas for achieving the vision. Design principles don't tell us what to do explicitly – that is the role of the design guideline, regulation, form-based code, or development standard. Design principles are mere ideas. They provide thoughts that help justify the larger vision, show options, and introduce notions that might not have been considered previously. Think of a design principle as the roadmap that gets us to the destination.

Creating the vision for Fort Union Boulevard entailed a three phase process. The beginning of the vision was initiated with



Corridors

Intensification of Development

Mix of Uses

Pedestrian + Bicycle Friendly

Easily Transversal Street

High Quality Landscaping

IDEA Meeting with the city helped to inform the design visions as principles desired for future growth: The above image represents the criteria for development along a corridor in London, Ontario after they had set out design guidelines for their city. Having these principles in place will help to steer future growth in the right direction

guidance from the City Council of Cottonwood Heights at a vision exercise held at the Council Office. The second phase included analyzing case studies of streets and transit design, which were informed by presentations from Fehr & Peers' Salt Lake City Office, and additionally by case studies associated with catalytic redevelopment. And, finally, the visions and design principles were produced by studio instructors and students through third phase synthesis of the first two phases with the addition of best practices for street, transit and redevelopment design as understood from the literature.

THE VISIONING EXERCISE WITH COTTONWOOD HEIGHTS

On the evening of 3 October, 2013, students and instructors from the Cottonwood Heights Streetscape, Transit and Redevelopment Studio met with the Cottonwood Heights City Council, municipal staff, and members of the public to engage in a visioning exercise. After a brief presentation from studio instructors, the City Council and other local stakeholders were questioned about their desires for the studio. After the presentation, Council members weighed in on the different transit options. The visioning event lasted approximately two hours. The following messages were relayed to the studio instructors and students:

1 With respect to all of the transit options, it is likely that the City would have to fund streetscape improvements;

2 Although Bus Rapid Transit is likely to be the least expensive of the transit options, it would require dedicated space at the center of Fort Union Boulevard and would likely impact traffic movements, including left hand turning. Concerns about BRT and terrain were also voiced. The same concerns exist with regards to the Light Rail option, yet it is likely to be the most expensive;

3 Streetcar Service is considered a local residential transit mode, much less than a regional transit mode. As such, it is one of the transit options that would cater most closely to the ridership, service, frequency, and accessibility demands of City residents;

4 The scale of Light Rail engineering would require a 65' turning radius that would significantly impact the possibility of its implementation on Fort Union Boulevard and necessary turning required to route it to the Class A office space at the corporate center at the northeast of the City;

5 Council members voiced desires for no more than a quarter-mile walk to transit stations;

6 Both Council members and planning staff voiced concern that doing nothing on Fort Union Boulevard might present a threat to the future of the city. Consensus at the visioning exercise suggested that doing nothing in the short term would surely result in a widening of the street over time, increased congestion, and an even worse urban arterial than the

one already existing. Accepting the status quo would result in a continuing deterioration of the quality of life in Cottonwood Heights, and a decreasing sustainability for the City. Inaction will lead to a decline in the livability of the City.

The following messages emanated out of the visioning exercise:

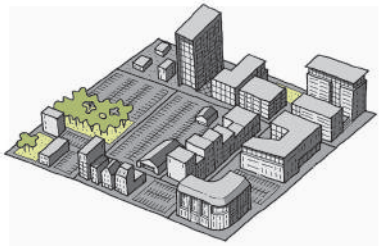
1 Aspects of the City of Cottonwood Heights that are most appreciated by its leaders and residents are the location of the City in the valley, its proximity to the canyons and ski venues, and proximity to the SLC airport. In addition, to these locational attributes other valuable characteristics of the city include: the residential nature of the place, the sense of safety that pervades the city, and the quality of life enjoyed by residents.

2 With respect to the qualities that most need improvement in Cottonwood Heights, the following issues were suggested: Fort Union Boulevard is not performing to its maximum potential. The urban arterial is highly congested, inhibits pedestrians, has too much vacant retail property, does not attract unique or desired retail, and is not lively in the least. Because Fort Union Boulevard is a primary east-west connector in the valley, the bulk of vehicular drivers use the street for commuting through the City, rather than choosing to stop and shop in Cottonwood Heights. The City has a need to address its housing/population mismatch, including a need for additional age appropriate housing for seniors, as well as starter homes and rental properties for younger people wanting to settle in Cottonwood Heights. Other issues that were discussed include: poor air quality, too few trails, the lack of a civic center and inadequate community facilities.

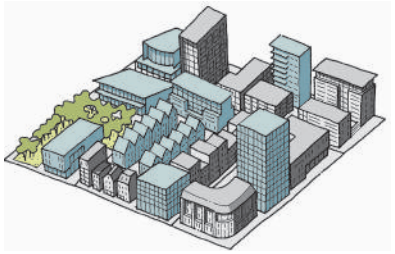
3 Perceptions of the City suggest a mixed bag of understandings. The City has the third oldest population in the state according to census demographics, and as such, needs to address the needs of its aging population. While outsiders envy those living in the City, little opportunity exists to relocate there because of housing limitations. Cottonwood Heights is a City dominated by single-family detached housing, yet the demand for a more diversified housing base continues to grow. This mismatch needs to be addressed. The City is perceived as innovative, fiscally sound, friendly, citizen-oriented and safe. At the same time, Cottonwood Heights is perceived as a suburban, large-lot, single family, commuter suburb.

4 When questioned about what they thought Cottonwood Heights could become, council members, staff and citizens suggested that they would welcome change to the image, function, and physical nature of Fort Union Boulevard, without diminishing the positive qualities already present in the City. Council members continue to desire the City to be a good place for families with

A City Built for Cars



A City Built for People



For positive changes to happen to the city the current standard for development must be re-examined: priority to parking lots are congesting streets and leaving wasteland space between buildings. New visions and principles will provide alternatives to the automobile and dramatically improve the look and function of the city

thoughtfully planned development. They want a City for everyone that adequately addresses its multi-generational population. Some council members welcomed an increase in density adjacent to Fort Union Boulevard to support increased transit ridership. This includes more diversified housing unit types, rezoning properties to allow increased height and lot coverage, and increased housing construction starts. Some also suggested that the city might engage in property "takings" to speed up the process of densification and diversification of the housing stock, but also to more efficiently rid the city of unwanted and aesthetically unpleasing properties. Across the board, participants at this visioning exercise see the City becoming a gateway to the canyons and helping to make the City more resilient with respect to year-round activities (beyond the winter ski season).

The most surprising finding of the evening's exercise was the desire to rebrand the City as a locale for unique dining and shopping opportunities, to recast the identity of the City, to reconfigure Fort Union Boulevard to enhance its "Main Street" qualities, and to provide a transit system and streetscape that could help catalyze this evolution.

5 With respect to new experiences desired for Cottonwood Heights, the mayor expressly stated that the City is ripe for new transit-oriented development that could help the City recast itself as a down-canyon destination. This means higher density development around transit nodes, that might include new service venues for the ski resorts, new hotel accommodations for those that can't afford high cost ski resorts, and a more year-round resiliency in offerings that won't be threatened by climate change. Other suggestions included: providing cycling amenities that could recast the city as a "mecca" for regional cycling and canyon access; better "mouth-of-the-canyon" parking and canyon access; and becoming the primary "basecamp" service center for the Wasatch Front.

Of note for Fort Union Boulevard, consensus was reached that the street needs redesign to include a new transit system, but also to encourage increased pedestrian activity, unique shopping venues, diversified dining, and more livable street amenities for residents, cyclists, and transit users. This vision is in line with other street livability movements across the nation, that seek to address the problem of the urban arterial and the monoculture of vehicle-based transportation that induces congestion, bypass functioning, and visual blight.

The map below shows the nodes identified by the city that are sites for potential redevelopment: these areas are the major intersections along Fort Union Boulevard as well as sites off the street that could benefit from connections made by future transit

CASE STUDY LEARNING

As part of the visioning exercise, presidents for both transit and redevelopment were examined. The first set of case studies evaluated models of streetscape, streetcar, bus rapid transit and light rail transit.

The second round of case studies involved analysis of positive exemplar cases associated with urban redevelopment. Three categories of redevelopment were examined in the second round of case study work: lifestyle centers, transit-oriented development, and district redevelopment.

Full summaries of the case study presentations can be found in appendices A + B.

TRANSIT CASE STUDIES

San Francisco, California's Octavia Boulevard

Octavia Boulevard is the first multi-way access boulevard built in the United States in over 100 years. The key lessons that can be extrapolated from this project: are large streets can be safe and functional for both pedestrians and cyclists; landscaping and street tree placement can have a significant impact to the street; multi-way boulevards distribute traffic evenly and do not cause congestion

New York City, New York's Ocean Parkway (boulevard)

Ocean Parkway is a large boulevard built over 100 years ago that became a landmark street, hosting the nation's first designated bike path. The design of the boulevard demonstrates: that even large, busy streets can be enjoyable locations and allow for both passive and active recreation opportunities; that tree placement is essential in creating defined space and bringing the scale down to human scale; that separating the cycle path encourages use and prevents conflicts with pedestrians

Toronto, Ontario Canada's Streetcar System

The Toronto Streetcar is a nineteenth century system that managed to save much of its original network through strong public support and continues to grow. The lessons derived from this study: streetcars can run effectively in the same lanes as traffic and do not necessarily need a designated right-of-way; that the style of rolling stock can play an important role in creating an identity for a city; that there is a favorable public opinion towards streetcars

Portland, Oregon's Pearl District Line Streetcar

The Portland Streetcar is a relatively new system that was not built until the last 20 years. This case provides the following lessons: that the addition of a streetcar can be the catalyst for economic revival; that having a transit system that allows for shared lane use minimizes construction cost and prevents right-of-way purchase; that the addition of a streetcar encourages development and infill along the transit line

Berlin, Germany's Metro Tram System

The Berlin Metro Tram is one of the oldest networks of tram systems in the world and was nearly eliminated after World War II. Thanks to the reunification of Germany the system began to be restored. The lessons garnered from this study: having trams connected to a larger network of transit makes for an efficient and accessible system; low floor tram cars allow for easy loading and existing and remove the need for raised platforms; stops are located close together in the city center for pedestrian convenience

Los Angeles, California's Metro Orange Line Bus Rapid Transit

The Metro Orange Line BRT originated as a rail service at the turn of the century and after protest of trying to convert the line to a subway system, was turned into a BRT. The Metro Orange Line demonstrates: branding of the line and busses gives the system a higher quality feel and serves as a means of branding; that BRT is as efficient and more flexible than LRT; that BRT lines can function effectively in suburban locations

Curitiba, Brazil's Bus Rapid Transit

The Curitiba BRT is the world's first BRT and is an exemplary example of planning and transit implementation. From this example several lessons are learned: that planning, zoning and transit work most effectively when correlated together, that smaller transit systems that feed into larger system dramatically reduce the need for automobiles; that fare collection before boarding significantly reduces the time busses spend at stations, creating a faster and more reliable system

San Francisco, California's Third Street MUNI T Line

The T Third Street line began as a streetcar system that was removed and rebuilt into light rail. The ideas that can be extrapolated: linking neighborhoods through transit can revitalize areas; building in the median space allowed for track space and room for landscape to improve the look of the street

Salt Lake City, Utah's North Temple-Airport Trax Green Line

The TRAX light rail is a newer system that was initiated as part of creating a transit alternative from the 2002 Olympic Games. There was initial public opposition to the project but since being implemented has proved to be successful and popular with citizens and municipal leaders. The TRAX LRT demonstrates that: a center loaded system is an opportunity for trees and landscaping and aesthetic improvement on the street; that left turn lanes can still work LRT lines; that larger streets are the easiest to build LRT in, given the amount of right-of-way required

REDEVELOPMENT CASE STUDIES

Salt Lake City, Utah's Lifestyle Center: City Creek Center

The City Creek Center is a new mixed-use lifestyle center built as part of a downtown revitalization effort. City Creek shows: that privately funded projects can be a viable redevelopment model; that any project can be environmentally conscious, no matter the size and scale; that placement of new retail needs to be carefully considered as it can have significant impact on nearby shopping districts

San Jose, California's Lifestyle Center: Santana Row

Santana Row is a lifestyle center built in Silicon Valley to provide higher end retail and housing options for the city. The success of the project shows: that mixed-use development is successful as people like having options to live, work and play in one location; that facing activity towards the street creates a more vibrant and successful public realm

Denver, Colorado Redevelopment Project: TAXI

The TAXI development was a brownfield project that repurposed an industrial site into an office space and urban living. The project is ongoing and builds on the success of each of its previous phases of development. From this example the lessons that can be learned: is incremental development can be an effective model and allows for greater flexibility; building sustainability invokes creative design solutions and is a sought out feature by many in the market;

Medellin, Colombia Redevelopment Project: Parque Biblioteca España

Espana Library Park was built as part of an effort to reduce crime in a slum. The project is relatively new, however, the positive effects from the project were seen relatively quickly. The lessons taken from this project: providing quality public space can have significant positive impacts to an area; iconic architecture can make a bold visual statement and provide a strong identity to an area; well-designed community facilities help to foster a sense of ownership with the citizens

Walnut Creek, California Redevelopment Project: Downtown Walnut Creek

Redevelopment of Walnut Creek's downtown core was accomplished through strong initiative by city leaders beginning in the early nineties. This project demonstrates: that walkabitly and pedestrian corridors that link the city are essential; that municipalities can take charge of their city and make substantial positive change; that public gathering spaces should be found in multiple locations throughout the downtown area

Oakland, California's Transit-Oriented Development: Fruitvale Village

Fruitvale Village is a transit-oriented development that was built as an effort to revitalize a low income immigrant communities in the late 1990's. The project shows: that a project is successful when it caters to local residents and provides for their needs; that government funding can be acquired to help offset project costs

Arlington, Virginia's Transit-Oriented Development: Rosslyn-Ballston Metro Corridor

The Rosslyn-Ballston Metro Corridor is a long range planning effort to create a series of transit-oriented developments that began nearly thirty years ago. This case showcases: how educating the public about planning matters is key to the success of a project and gathering support behind it; that transit stations can serve as catalyst for redevelopment; that a well thought out planning policy is important in keeping the project progressing and producing quality build environments.

Vancouver, British Columbia Redevelopment: False Creek North

False Creek North is a large scale redevelopment that took a once industrialized and deteriorating area of the city and redeveloped it to create a prime location in the city for office, residential and retail uses. The lessons learned from this case: involvement from the public is crucial and the planning and design process should not be a top down process; higher density development can help to preserve open space and provide more opportunities for greenspace and recreation areas.

Portland, Oregon Redevelopment: The Pearl District

The Pearl District is a redevelopment project driven by the implementation of a streetcar system and further progressed through building revitalization of public space improvement. The Pearl District shows: that mass transit can act as economic catalyst; adaptive re-use is efficient and effective in revitalization efforts.

VISIONS AND DESIGN PRINCIPLES

VISION STATEMENT 1 TRANSIT SELECTION FOR COTTONWOOD HEIGHTS' RESIDENTS

COTTONWOOD HEIGHTS WILL SELECT A TRANSIT MODE THAT WILL BENEFIT THE CITY'S RESIDENTS, THEIR TRANSPORTATION NEEDS AND DESIRES, AND THE OVERALL ECONOMIC, SOCIAL AND ENVIRONMENTAL WELL-BEING OF THE CITY.

DESIGN PRINCIPLE 1 THE PROCESS OF TRANSIT MODE SELECTION

In weighing the pluses and minuses of each transit mode presented in this monograph (beyond and considering the necessary discussions about costs and financing), the process of transit mode selection should consider first and foremost the needs of the City's residents, their destination desires, their hopes and dreams of how transit can help in remaking their community. The City might engage in civic engagement exercises to gauge desires and preferences. These might include a series of focus groups with representative members of the community, user preference studies that determine subjective desires, focused and thematic presentations, and kitchen table gatherings where implications of each mode can be discussed with municipal leaders openly, honestly and without pretense. Make no mistake, mass transit along Fort Union Boulevard will be a catalytic opportunity for the City – but will also change current patterns of everyday life. What are the tradeoffs that Cottonwood Heights residents are willing to accept in exchange for each mode? How do residents want to see their city evolve? Where lie their fears? Do insecurities or excitements exist that might dampen some modes and elevate others?

DESIGN PRINCIPLE 2 REGIONAL CONNECTIONS

Any transit mode selection process will also need to consider the larger regional implications of the mass transit system in the valley. Whichever mode is selected will need to provide a seamless set of transfers from the light rail transit system offered by Trax to the mode selected for Fort Union Boulevard. The Copper Line or "C" Line should provide a mechanism for regional transit riders to access Big Cottonwood Canyon and the park and ride lot at Wasatch Boulevard. Any of the modes presented in this monograph can work seamlessly with the Trax station in Midvale at Bingham Junction. None of these modes will be implemented however, without adequate discussions with the City of Midvale. Issues to be considered with Midvale include station locations, Midvale's mode preferences, funding/financing, streetscape integration, design characteristics, system operations, frequency, and a multitude of other considerations. Potential competition with Sandy City for shared basecamp function, or, potential expansion of the system and partnership with Sandy, might suggest new opportunities for kick-starting implementation talks. Extending any system into the canyons might also refocus transit mode selection, system transfers,

and routing. Possibilities exist for a one way single track loop from canyon to canyon, airborne gondola/skytrain systems, or possibly extended shuttle bus service (or any hybrid multi-model transfer system). Airport to resort connections will also need to be considered, including travel time and ridership costs. Needless to say many options exist. Political will, funding/financing, transit agency willingness/support/opposition, and local support will all play a role in final regional decision-making. The City of Cottonwood Heights needs to realize, however, that these modes will not all produce mutually satisfactory results for the City's residents. Light rail will never become a system that allows easy boarding and disembarking in close proximity to most residents' homes; it's just not designed for that. Streetcars will probably never become the fastest commuting option. Bus rapid transit will probably never approximate the romantic cachet and nostalgic pull of historic trams or trolleys. Weigh the tradeoffs.

DESIGN PRINCIPLE 3 STATION LOCATION, PROXIMITY + DESIGN

As supported by council members at the civic engagement event, transit stations are best located as close as possible to resident locations (voiced at that event as within a ¼ mile walk), and should be located adjacent to desired destinations (such as retail, entertainment, community centers, civic institutions, and parks). At the least, transit stations should be located adjacent to new catalytic development site, transit-oriented development (by definition and de facto), and any new civic center site. Frequency of stops will be determined largely by transit mode type. Standard bus and streetcar systems will undoubtedly stop at closer intervals and run more frequently. These are largely local serving collector systems that cater largely to residents, neighborhoods, retail destinations and local economic development strategies. Bus rapid transit and light rail are largely about delivering commuters at the regional scale. Their benefits to local retail development are debated. They are designed by transit agencies largely to address metropolitan policy objectives, rather than micro-economic issues at the local scale. At times they are strategized to lift places out of congestion. Station design in itself can become an attractor to increase ridership within each mode type. As a rule of thumb, expect that the heavier systems with dedicated laneways will result in more elaborate station design. Standard bus and streetcar systems can easily operate with reduced-scale stations. Many cities with new streetcar systems utilize bus shelter structures that have few amenities. Some have contracted with the French company JC Decaux, who can donate shelters to the city in exchange for advertising rights to the shelter surfaces. Within this locale in the valley bus and streetcar stops should provide at minimum protection to the winter and summer elements.

DESIGN PRINCIPLE 4 TRANSIT INTEGRATION WITH FORT UNION BOULEVARD

Fort Union Boulevard is the primary east-west urban arterial through this part of the Salt Lake Valley. Transit mode selection for Fort Union Boulevard will need to weigh the benefits and detriments that accrue to the overall transportation picture of the street, and particularly with respect to vehicular traffic loading. While some degree of vehicular capacity will surely be lost on the street after mass transit implementation, increased transit ridership will help to offset that capacity loss. Whichever transit mode is selected, disruption of movement along Fort Union Boulevard should be kept to a minimum. It is unlikely that the street can absorb too much of a "road diet" without large impacts to congestion. Adding new modes along the street will also play into mode selection. At spots along the 4+ mile route of Fort Union Boulevard in Cottonwood Heights, the right-of-way becomes pinched by adjoining properties. Some degree of differential property taking will need to occur to allow different modes to be implemented. Standard bus and streetcar will require no takings. The specifics of design for the bus boulevard, bus rapid transit, and light rail transit will all result in more complex negotiations with private property owners. Of particular importance to the streetscape proposals are the needs of cyclists, pedestrians, and the mobility challenged. Intersection design will need to be re-evaluated and considered deliberately under each mode option. Some modes will make crossing Fort Union Boulevard more easy, others more difficult.

VISION STATEMENT 2 DENSER URBAN FORM TO SUPPORT TRANSIT RIDERSHIP AND A NEW FORT UNION BOULEVARD EXPERIENCE

TO CREATE A NEW FORT UNION BOULEVARD, COTTONWOOD HEIGHTS WILL REBUILD ITS INNER CORE WITHIN TRANSIT-ORIENTED NODES TO PROVIDE ADDITIONAL HOUSING UNIT DENSITY TO SUPPORT THE TRANSIT MODE THAT IS SELECTED FOR THE STREET.

DESIGN PRINCIPLE 5 HOUSING + EMPLOYMENT DENSITIES TO MATCH TRANSIT MODE TYPE

Our partnership with Fehr & Peers suggests that transit be supported with increased housing densities to provide a necessary rider base to support transit investments. This applies in principle to new development built in the quarter mile for local access riders, and within the half mile for commuters using transit to work. Policy and zoning recommendations suggest that if bus rapid transit is the selected mode for Fort Union Boulevard, new development be built to a goal of 10 housing units per acre and 20 jobs/employees per acre; for streetcars, housing units per acre should meet or exceed 20 and jobs/employees should approximate 25 per acre; and for light rail transit new residential development should meet or exceed 30 housing units per acre, and jobs/employees should meet at least 50 per acre. Now, in most cities of the sunbelt, mountain west

and west coast, people hear the word density and run for the hills. This need not be the case. Higher density housing no longer takes the shape of failed towers in the park associated with public housing. In point of fact, most of Greenwich Village in New York City is 4-stories and lower, and manages to reach densities approaching 200 units/acre. So to reach densities of 30 units/acre, Cottonwood Heights need only consider 2-4 story townhouses, rowhouses, or luxury apartments. Most in the Salt Lake Valley would find that completely palatable.

DESIGN PRINCIPLE 6 NEW HOUSING TYPES FOR A MORE DIVERSE DEMOGRAPHY

In response to demographic concerns that situate Cottonwood Heights as one of the older populations in the state, the City should incentivize and encourage housing that helps older residents move out of over-sized housing that was appropriate during their younger family-rearing stage of life. Many seniors are fully ambulatory and might opt for different housing products that allow the formation of different interest-group based communities, less yard work, smaller living spaces, and housing in closer proximity to amenities. Innovative housing types for seniors might include open-plan lofts, attached townhouses, small house/small lot/ small garden homes, and age-based communities. We are not speaking here about managed facilities, hospices, or old folks homes. Utah residents are living longer with high quality of life expectations. These new housing new housing types should not skimp on quality. The high quality of life in Cottonwood Heights is unlikely to result in housing price declines, so any newly-listed sale properties are unlikely to transfer over to first-time home buyers and those just starting family creation. On the opposite end of the housing spectrum, Cottonwood Heights might also incentivize the building of starter homes for new families, or the permitting of secondary units, single property second homes, and higher density “cool” housing that would be attractive for younger professionals, young families, and the newly partnered. Much of this housing can be co-located with the catalytic redevelopment projects cited in this monograph to meet increased transit-supporting densities

DESIGN PRINCIPLE 7 NODAL, DENSER, SYNERGISTIC TRANSIT-ORIENTED DEVELOPMENT

Coupled with the selection of a transit mode, the city council should adopt a transit-oriented development policy that can help raise residential densities and match these to the type of nodal project planned for each catalytic redevelopment site. For instance, over an active entertainment or town center development, the appropriate housing type might target young singles, those with active lifestyles, or newly independent seniors whose families have now moved to form other households. Conversely near a civic center, you might think to include facilities for seniors, young families that might benefit from the amenities, or higher density apartment units. In gritty warehouse districts, or up against infrastructure

lines, this might be a location for artist lofts, entrepreneurial households, or home businesses. In addition to residential uses, many cities have sought a retail mix that synergizes well with the local setting. Next to movie theaters, bookstores, late night restaurants, bowling alleys, and sports bars seem to be a good mix. Next to nodes dominated by families, day care facilities, arcades and fun centers, local serving retail, dry cleaners, and other well-frequented retail used on a daily or weekly basis.

DESIGN PRINCIPLE 8 NEW URBAN DESIGN EXPECTATIONS IN CITY MAKING

To evolve the urban arterial requires new expectations about urban performance, the culture of everyday use, and how buildings are best sited. To create a walking environment along Fort Union Boulevard will require zoning changes to ensure that buildings are situated to create a continuous street wall along the edge of the public right-of-way. To provide pedestrian comfort in both inclement weather, as well as the stultifying heat of the Utah summer, the city should adopt a policy that requires a continuous tree canopy of deciduous trees to allow light through leaf-free branches in winter and heavy dappled shade in summer. To encourage people to linger, shop, socialize, and invest in place, public realm spaces need to be made comfortable with ample seating, tables, umbrellas, heaters in the winter, and spaces to come together. In some urban places, the city should attempt programming that brings people out. Several different strategies will have to be put in place: a change in development standards, active involvement in community programming, bringing on partners who can carry some of this burden, new policies to encourage density, creation of a street wall, public art strategies, night markets, and new public realm investments. All of this takes time and money. This evolution will also require some degree of public education to show shop and property owners that their businesses will not decline because parking has been moved to the rear, rather than the more typical sea of parking fronting the shop. The City and its planners cannot settle for status-quo city-making and as-of-right development practices that continue to produce places what are not loved, admired or cared for.

DESIGN PRINCIPLE 9 NEW + SURPRISING ZONING STRATEGIES

Across the country and around the world, Euclidean zoning is under the microscope and up for debate. At times zoning is an appropriate response to achieve urban design outcomes, at other times in gets in the way. Several zoning strategies exist to incentivize or inhibit redevelopment of existing and under-utilized urban redevelopment sites. Up front we strongly suggest that the City of Cottonwood Heights not rezone or upzone all of the properties that might be considered for redevelopment, but rather pointedly study how and when zoning might be used to the greatest end. A couple of examples can help to demonstrate this. The City of Philadelphia has recently gone through a rezoning of the entire city practically. Its economy is slowly recovering

and it decided to rezone to incentivize and speed up this process, basically by giving it all away for free and helping to streamline the permitting and development process. Cities in the United Kingdom require that every property owner that is upzoned pay a difference in land value back to the municipality in exchange for the upzoning, with the thought being that the upzone will result in increased population, and the difference in land value entitlement paid to the city can help offset services and public realm improvements. The City of Vancouver, Canada is smart in refusing to upzone across the board and wait for development proposals to come in across the counter. In this way when a developer asks for a planned-unit development or an official community plan, the city can use its discretion in negotiating the upzone in exchange for exactions that help to pay for new services or public amenities. Since Vancouver is a boomtown with no shortage of development options, they can remain a 'weak zoning' city and ensure that the public realm is paid for by new development. So, for Cottonwood Heights, think creatively. Don't make rash zoning decisions. Consider the position of your City, ie, boomtown or struggling town? And use zoning to achieve urban design ends.

VISION STATEMENT 3 SUSTAINABILITY + RESILIENCE TO WITHSTAND FUTURE THREATS

COTTONWOOD HEIGHTS WILL BE A MORE SUSTAINABLE CITY – A PLACE THAT CAN BECOME AN EXAMPLE OF GREEN LEADERSHIP FOR THE LARGER SALT LAKE VALLEY – AND A PLACE THAT WILL BE MORE RESILIENT IN FACING FUTURE THREAT.

DESIGN PRINCIPLE 10 RAPID ACTION TO FORESTALL WORSENING TRAFFIC CONDTIONS

At the beginning of this partnership between the City and the University of Utah, planners from Cottonwood Heights spoke about the urgency in addressing Fort Union Boulevard before much more damage was done by increased traffic, or conversely by bending to pressures that would further widen or increase congestion on the street. Since the studio began in September 2013, several street alignment and turning movement decisions have been made that are likely to worsen traffic conditions. Street engineering and roadway changes that incrementally favor drivers over other more benign modes of transport are an invisible and silent menace to cities and local livability conditions. A rapid decision in selecting the mode of transit, and aligning future policy parameters to the future orientation of the street should be made and owned whole-heartedly by city and planning leaders in Cottonwood

Heights, in collaboration with partner agencies of course. This will help near-term decisions align with long-term goals. It begs the question: How serious are city leaders in evolving the street to their own desires, or is status quo incremental growth of the street not a concern?

DESIGN PRINCIPLE 11 THE LONG GAME STRATEGY OVER SHORT TERM EFFICIENCY:

The history of mass transit design in the Salt Lake Valley shows an amazing 'can-do' aptitude and attitude in affecting transit outcomes. More miles of LRT implementation have happened here over the last decade and a half than have occurred in any other city in North America. That is quite the accomplishment. On the other hand, the method by which this has been accomplished is now being questioned in some circles. The locations of LRT development have utilized expired rail lines that move through destinations that are far from desirable, far from likely pedestrian destinations, and through land that requires both remediation and other infrastructure investments. The efficient and expedient answer often results in longer redevelopment timelines with respect to the land around the LRT line. In like manner the expediency of the Sugarhouse S Line is already being questioned, even though the line is in its infancy. The S line is called a streetcar line, even though it does not meet several criteria in the definition of a streetcar (it uses heavy LRT rolling stock; it is in a dedicated rail corridor rather than on a street; and it runs infrequently). Its one saving attribute is that its station stops are placed approximately ¼ mile apart from each other. Making the right decision (over the expedient or most efficient option) with respect to transit mode selection is the greatest design decision that will be made. During the time of the studio, we have seen various agencies and actors suggesting preferences for one mode over another. Sure, BRT is less expensive in the short term, but what about its long-term costs or effectiveness? Do Cottonwood Heights residents really want to ride the "sexy bus"? Yes, streetcars are elegant and provide nostalgic comfort, but can they be extended across the valley or up the canyons? Indeed, LRT systems can move people quickly across the valley, but do Cottonwood Heights residents benefit from it crossing through their city?

DESIGN PRINCIPLE 12 TRANSIT + LANDSCAPES IN SUPPORT OF IMPROVED AIR + WATER QUALITY

We know that certain tree species have the ability to phytoremediate pollutants in the atmosphere, including some airborne materials and toxics in stormwater runoff. We also know that certain transit types are less polluting than others. Clean diesel still produces particulate matter that might not enter personal respiratory systems, but still enter the hydrologic system. As a design principle of this monograph, we suggest that whatever tree and vegetative species are considered, they be investigated in terms of their abilities to help scrub the air, and filter polluted waters. In like manner, transit mode selection should consider these variable as well.

DESIGN PRINCIPLE 13 WATER-CONSERVING STREETSCAPES + LANDSCAPES

The use of native and drought tolerant plant species can help conserve water resources and reinforce the natural identity of the City in the region. To survive into the future, innovative irrigation strategies will need to be used for urban plant life to establish itself and grow into maturity. These should combine stormwater and irrigation strategies into a mutually reinforcing system. But beyond survivability, trees, grasses and other vegetation are necessary for creating an attractive and comfortable public realm. Green infrastructure can offer low impact alternatives that can effectively manage resources and reduce negative externalities. Innovative stormwater drainage strategies should be considered in planning the reengineering of the street, including: perforated curbs that allow stormwater into tree wells; silvacells and below grade cistern storage of stormwater that can be collected for year round use during wet periods; bioswales that can attenuate stormwater into desired places in the landscape; and, permeable pavers, green roofs, rain gardens, and xeriscaping wherever possible.

DESIGN PRINCIPLE 14 FACING DOWN THE THREAT OF LOCAL CLIMATE CHANGE

Current projections for climate change in the Salt Lake Valley over the next + 50 years suggest an increase of 8 degrees Fahrenheit during the summer months on average. July-August temperatures of 98 degrees average daytime temperature will put the Salt Lake Valley on par with Phoenix in climatological conditions. This will have adverse impacts on most every vegetative species in the region. Sod will dry to dust without necessary irrigation increases. Many current deciduous tree species will struggle for survival. Kitchen gardens will require more attention to daytime highs and possible scorching, especially with our lack of humidity. Public realm plantings will need a full-scale overhaul to address this temperature increase. More importantly for Cottonwood Heights, however, we will see up to a two month reduction in the ski season. This will be catastrophic for many of the up mountain resorts. It may provide new opportunity, however, for Cottonwood Heights, if the City can formulate a year round outdoor recreation strategy, and capitalize on its location between the valley and the mountains.

DESIGN PRINCIPLE 15 MORE COMPACT + EFFICIENT DEVELOPMENT PATTERNS

As part of a larger sustainability strategy, land consumption and project design must become more efficient through greater compact development patterns. Land and zoning policies might be adjusted to ensure smarter growth or higher quality growth by adjusting lot coverage minimums, lot proportions, and reducing public right-of-ways for streets and infrastructure.

Along with land policy adjustments, housing types that conserve land might be investigated to reduce housing costs, conserve more energy through smarter HVAC or passive

heating and cooling systems, and provide the potential for greater transit ridership in close proximity to stations. Compact development in close proximity to transit, retail, service and amenity destinations will encourage walking. Higher density development on smaller properties will help to change the nature of the public realm. When individual housing units have no private exterior space, the public realm becomes the compensatory exterior space for higher density living – thus creating a more lively public realm, enhancing opportunities for community formation, and fostering the demand for high quality design of plazas, parks, streets, and other amenities.

VISION STATEMENT 4 A MORE LIVABLE PLACE WITH A HIGHER QUALITY OF LIFE

COTTONWOOD HEIGHTS AND FORT UNION BOULEVARD WILL BE MORE VIBRANT AND LIVABLE, AND OFFER RESIDENTS MORE CHOICE, A HEALTHIER SOCIAL LIFESTYLE, AND A HIGHER QUALITY OF LIFE.

DESIGN PRINCIPLE 16 URBAN LIVABILITY THROUGH CHOICE STRATEGIES

Part of the newly emerging theory of livability suggests that once basic needs, safety and public services have been met for any geographical location, the action that can help advance quality of life and livability concerns the greatest is to offer residents and visitors as much choice as possible in helping to fulfill their subjective desires. Choice under a livability strategy means providing options for people to get the most they can out of a shared environment. Choice categories include: housing type, retail options, dining possibilities, leisure space and public realm amenities, transit mode options. The urban setting that can offer multiple dining options will be attractive to the most people. Imagine a town center that can offer a food court to those who are somewhat short on cash, while at the same time offering dining options to those flush with paycheck. Alternatively, the town center could provide entrepreneurial activity for food trucks, frozen yogurt to the tweens, gelato to those on an afternoon stroll, and Crown Burgers to those with a hankering for the unhealthy. Everyone is satisfied, except maybe for those with indigestion. Choice strategies help to celebrate difference and encourage social mixing and greater diversification.

DESIGN PRINCIPLE 17 NATURE IN THE CITY

We know that urban areas that provide ample outdoor activities, and close proximity to nature offer higher qualities of life and promote healthier bodies and mindsets. Nature is a palliative healer to dense urban living. This principle was introduce to America by Frederick Law Olmsted in the mid-19th Century and was a core belief of the Reform Movement that begat the field of city planning at the turn of the 20th Century. With the expected climate change

that is likely to take place in the region over the next few decades, we will need to address the reintroduction of new plant types throughout the Valley. This offers an opportunity to reconsider nature in the city. We can jumpstart this process by designing, selecting, and planting species in advance of this temperature change, and in doing so, improve quality of life for Cottonwood Heights residents in the short term. How to accomplish this? New streetscapes that encourage walking, strolling, and social gathering; urban nature trails that allow quick access to nature on lunch breaks for workers; public realm spaces heavily shaded by tree canopies in hot Utah summers; parks that are landscaped for aesthetic beauty in mild winters, where residents can see the wonder of snow falling on cottonwoods; protected wilderness stretches along Big Cottonwood where flora erupts each season, and fauna finds home in the city.

DESIGN PRINCIPLE 18 HUMAN-SCALED INFILL DEVELOPMENT TO SHAPE THE PUBLIC REALM

When we speak of denser or transit-oriented development in this monograph, we have no image of Manhattanesque towers or Soviet residential slabs in mind. Instead the suggested vision for Cottonwood Heights around Fort Union Boulevard is that it be populated with new infill development that helps to provide enclosure for the street, shape new public realm spaces and allow iconic structures for new municipal buildings. All of this can be accomplished with buildings no higher than 3-5 stories along the City's urban arterials and in new catalytic development areas. At the corners of intersections the buildings should step up to 5 stories to provide a visual focus for pedestrians and to provide greater economic return to developers. This is a principle that has been adopted across cities of the American west: San Francisco, Portland, Vancouver, Santa Monica, Denver. Infill locations along Fort Union Boulevard should be shaped and structured to harmonize with adjacent properties while still permitting higher density development. New development adjacent to residential areas should step down to meet their neighbors. As an over-arching principle of city-making, new buildings in Cottonwood Heights should reflect a human-scaled urbanism that is well-articulated on facades and steps back on upper levels to accommodate light, and warmth in winter months, and shade coverings over sidewalks in the summer. Americans tend to have a distaste for 'high' density, but are more accepting of 'higher densities' than what we find in low-slung suburbs. Semantics are important. We need to remember that even Greenwich Village in Jane Jacobs' New York City was only a neighborhood of four and five story buildings (on average) that reflected the time in which they were built, but also the humanity possible in city living.

DESIGN PRINCIPLE 19 HUMAN COMFORT IN A HIGH DESERT CLIMATE

The Salt Lake Valley basically supports a two season annual cycle with very short springs and autumns. For people to use the public realm in either winter or summer, urban design strategies must be concocted that allow an adequate degree of human comfort – heated places in the winter and shaded places in the summer. Functional landscapes should become the norm on Fort Union Boulevard, ie, deciduous trees that let light and sun warmth onto sidewalks in the winter; closely spaced deciduous canopy trees that provide dense shade over sidewalks in the summer. Strategies for winter public realm spaces include: awnings that extend over sidewalks to protect pedestrians from the elements, transit shelters that provide roofing and heating devices, cafes with portable heaters, and roofed public gathering spaces where community programming can extend to year round calendars. For summers, street trees that form a continuous canopy with few breaks will help to promote the pedestrian nature of the street and will require closer-than-normal spacing, structured soils, and innovative drainage systems. Other strategies for high heat periods include the use of evaporative cooling, fountains in public realm spaces that recycle water, umbrellas over café seating, recycled plastics for benches and seating that don't retain heat for long periods, and innovative shading devices

DESIGN PRINCIPLE 20 MIXED, MULTI-MODAL TRANSPORTATION OPTIONS FOR EVERYONE

In its current configuration, Fort Union Boulevard serves a primary purpose in moving vehicular traffic back and forth. Discussions about road widening here follow status quo engineering practices that result in counter-intuitive results – typically meaning even more intensified congestion. Livable street initiatives seek to combat vehicular congestion by multiplying transportation mode choice considerably by the addition of other less impactful movement types; mode types that are enjoyed and used by a wider and more diverse population. Mass transit enables those without vehicles to easily access the City and help contribute more readily to the City's economic development goals by enhancing retail, services, and community association. Cycling helps to provide opportunities for a healthier population, while contributing to larger sustainability efforts in resource conservation and improved air quality. Increased pedestrianization enlivens the city in multiple ways, results in greater sales receipts, and enables serendipitous meetings of citizens, neighbors and friends to solidify notions of community. Streets designed for pedestrians are also streets that can easily be made universally accessible. Enabling Fort Union Boulevard to serve the widest and most diverse Cottonwood Heights population, means that everyone can take part in the City – a street for people.

VISION STATEMENT 5 A DESTINATION CITY WITH AN IDENTIFIABLE BRAND

COTTONWOOD HEIGHTS WILL EVOLVE TO BECOME A DESTINATION CITY ASSOCIATED WITH IMPROVED RETAIL, DINING, AND RECREATIONAL CHOICES FOR RESIDENTS AND VISITORS – AS IT REFOCUSES ITS ENERGIES ON BECOMING A SUPPLEMENTAL LOCALE AND SERVICE CENTER FOR EXPANDED MOUNTAIN TOURISM.

DESIGN PRINCIPLE 21 DECIDE ON A POLICY OF DESTINATION CREATION AND ENCOURAGE PEOPLE TO STOP AND SPEND SOME TIME IN COTTONWOOD HEIGHTS:

A large percentage of the traffic on Fort Union Boulevard uses the arterial to bypass congested traffic conditions on Interstate 215 and Wasatch Boulevard. Cottonwood Heights City Policy should focus on changing the nature of Fort Union Boulevard to become a local collector and shopping arterial, rather than a primary urban arterial that connects destinations across the valley. Slowing down the traffic to a lower performing Level-of-Service will help drivers once again choose the more appropriate Interstate route to access canyon destinations. Slower moving traffic on Fort Union Boulevard will enable drivers to see retail, dining, service and entertainment venues along the street and perhaps stop and invest in the local economy.

DESIGN PRINCIPLE 22 CRITICAL REGIONALISM IN URBAN, BUILDING + LANDSCAPE DESIGN:

This next design principle is a passage taken from Michael Larice and Elizabeth Macdonald's Urban Design Reader, 2nd Edition (Routledge, 2012). It describes the notion of critical regionalism that can be applied to urban design, architecture, and landscape design. Critical regionalism is an answer to placelessness and a strategy that most of us can agree on.

"Although we tend to think of regionalism as a 20th Century pursuit, regional attitudes in design are recognizable characteristics of most pre-industrial place-based settlements. These urbanisms had to rely on building materials that could be sourced regionally, designs that were scaled and erected based on human physical capability, and local craftsmanship that developed in response to local conditions for construction. Prior to the industrial revolution when transport, communication and manufacturing processes liberalized access to resources and technical innovations, we might say that most built environments were de facto regional. Then in the industrial period, all of this changed as materials could be transported across the globe, factory-based production could mass produce building components, and communication improvements allowed the sharing of design techniques and strategy with disregard to context. A conscious turn to regional design became a strategy in the 18th and 19th Centuries, and again in the late 20th Century to reinstill a sense of place and local culture that had been lost with growing industrialization, global homogenization, and

the widespread use of universalizing (and often oppressive) architecture movements. Regional design approaches helped to make neo-classicism, factory-based production, and international style modernism more palatable to local tastes as well as help to reinforce a sense of place-based pride. From Marie Antoinette's rustic milkmaid's cottage, to Barry and Pugin's Houses of Parliament – from the Craftsman aesthetics of Ruskin, to Le Corbusier's Chandigarh buildings – notions of regionalism have been used to conjure up and reinforce imagery associated with local culture, everyday life, regional craft traditions, and national identity."

"Critical Regionalism in the late 20th Century was born of a similar discontent with the universalizing and globalizing nature of modern design. The term was first defined in 1981 by Alexander Tzonis and Liane Lefaivre to describe the work of several Greek architects in the mid-20th Century who were able to combine local inspiration and regional attitudes with the prevailing modernism of the time. It was further defined in a series of ground-breaking articles by Kenneth Frampton. These and other authors suggest that Critical Regionalism is an attempt to resurrect local differentiation in design with the pragmatic realization that it will be modulated by the exigencies of the modern world, eg, the inclusion of modern technologies in form-making. It is "critical" in two senses: first, it is a critique of the universalizing intentions of international modernism, and second, it is a critique of the sentimentalizing and nostalgic practices of regional culture and local traditions in themselves. This burgeoning movement alerts us to the often placeless nature of modernism, while attempting to reinforce a contemporary and phenomenologically-based authenticity – one that is more representative of places and local constraints."

DESIGN PRINCIPLE 23 IDENTITY + BRANDING STRATEGY 1: A VISIBLE AND MEMORABLE STREETSCAPE

The streets movement of the last 20 years suggests that streets are the most important public realm spaces that cities have. Depending on the nature of urban structure in any place, streets occupy 25-40 percent of the land area in any city. Every street has a visual character. Enhancing that character to reinvigorate the place-based nature of a city is a rather simple strategy in recasting an urban brand. Several examples from around the world can help to illustrate the power of streetcape in creating memorable imagery: the shaped bosques of trees along the Champs Elysées; the Roman pines along rural roads in Italy; Antonio Gaudi's light fixtures along the Paseo de Gracia in Barcelona; the sycamores that line Main Street in Brigham City; the blue glazed bricks of the streets of old San Juan, Puerto Rico. Streets can become a memory device. But more importantly, well designed streetscapes have the ability to raise property values as well. Several studies have shown that well designed street tree lines can raise adjacent property values between 10-15%. Allan Jacobs, the author of Great Streets, suggests that street trees are the greatest bang for the buck when implementing an urban design strategy. Picturesque streets

have been at the heart of many civic branding campaigns to attract investment, visitors, and reinforce a sense of place.

DESIGN PRINCIPLE 24 IDENTITY + BRANDING STRATEGY 2: EXAPANDING THE SKI SEASON TO YEAR ROUND RECREATION

Cottonwood Heights has an opportunity on its hands. With climate change on our doorstep, the catalytic push that new transit will bring, several large redevelopment sites about to come on hand, and in 20 years a quarry site that will go offline – the city has the land and redevelopment potential to recast itself as the valley's recreation mecca. Currently the ski season runs about 6 months in length, with climate change this will likely be shortened. The resorts and up-canyon locations will also be recasting their possibilities to include other types of mountain recreation: biking, hiking, rock climbing, trail running, camping, canoeing, rafting, fishing, cycling and bouldering. This strategy could also apply to more affordable hotel destinations than are currently offered at the up-canyon resorts. Basecamp functions need not have a winner and loser between Sandy City and Cottonwood Heights. Plenty of recreation service providers could be located in both cities, if not across the full Wasatch front. Cottonwood Heights could become the cycling center of the Wasatch Front. This strategy seems like a no-brainer.

DESIGN PRINCIPLE 25 IDENTITY + BRANDING STRATEGY 3: PROVIDING NODAL DEVELOPMENT THAT IS NEEDED AND DESIRED BY CITY RESIDENTS

The most obvious identity and branding strategy for Cottonwood Heights is to use the redevelopment of Fort Union Boulevard as a concurrent strategy alongside redevelopment of large or aggregated parcels to offer new lifestyle amenities appropriate for the domestic economies of city residents. Currently many people living in the City leave it to find fine dining, shopping, and entertainment options. While we don't recommend competing with the like's of Salt Lake City for theater, ballet or the symphony, we do suggest it carve out a niche for itself in competing with its neighbors (Murray, Holladay, Midvale and Sandy) for dining, shopping, family-based entertainment, and local recreation. The catalytic development sites within the City offer plentiful opportunity towards this end. Brand the city by what its citizens want. This might require some market research, but it may be the low-hanging fruit that leads to success.

PROPOSALS FOR PUBLIC REALM IMPROVEMENTS

STREET + TRANSIT MODES DEFINED

Four street and transit types are the focus of this urban design studio. These are detailed in the monograph herein. These are: boulevard streetscapes, streetcar and tram systems, bus rapid transit, and light rail systems. To understand these categories we provide for you simple definitions to understand the street or transit type and how to differentiate them from each other. The table that follows these definition can help elucidate the technical and quantitative differences associated with each transit type.

STREETSCAPE

A modern, late-20th Century term that describes the visual elements of a designed street that collectively form the character of the street, including: the roadway configuration, the relationship of the buildings to the right-of-way, building façade detailing, proportion of buildings to right-of-way width, structuring elements (such as street trees, luminaires, and hardscape materiality), street furniture (such as benches, fountains, bike racks, bollards, transit stations, rubbish bins, and other lighting), activity spaces, other public realm spaces and elements, public art, banners, signage + murals, appropriate plant species selection, seasonal changes, and sensory atmospheric effects (such as music, the sound of birds, lighting effects, the aromas from food carts, seasonal vegetation sounds and scents). Streetscape design provides cities with an opportunity to program the branding, imageability and memorability of the public realm. Often streetscape design includes the diversification of transit modes to provide for a more livable and user friendly right-of-way for multiple modes of access, but primarily focusing on the pedestrian experience.

BOULEVARD

A middle French term that describes a roadway configuration that includes the function of a pedestrian promenade with vehicular movement that is often separated by speed and directionality. Boulevards are often heavily landscaped with street trees (in the European tradition), and frequently allow multiple modes of transportation to exist side-by-side in their own dedicated spaces. Two primary forms of boulevard exist in the western experience:

1. An urban arterial often divided by a large landscaped median (in most instances, this is known as an avenue);

2. A multilane urban arterial where fast-moving vehicles occupy the center lanes, which are then separated by well-landscaped medians to the side of these center lanes that protect slower moving access lanes (this boulevard type is known as the multi-accessway boulevard).

Avenues are prominent in most cities of the United States, while the multi-accessway boulevard was popular in the 19th

Boulevard example: Octavia Boulevard in San Fransisco, CA

Boulevard example: Champs Elysees; the classic of the multi-accessway boulevard. Over time the side access lanes have been filled in with pedestrian amenities

Century after the example of Paris but then fell into disuse until their reintroduction in the late-20th Century under the advocacy of Allan Jacobs and Elizabeth Macdonald (see: Jacobs, A. 1993. Great Streets. Cambridge: MIT Press; and Jacobs, A., Macdonald, E., and Rofé, Y. 2002. The Boulevard Book. Cambridge: MIT Press). Avenues in the USA provide opportunities for creative regional streetscape, and offer opportunities to redirect left turn movements far before the arrival at an intersection, in what has become know as the "Michigan U-turn" or conversely as the "Michigan left". Recent issues and debates concerning multi-accessway boulevards include: issues associated with merging vehicles at intersections, the need to re-educate American drivers, traffic incidents between vehicles and other modes of transportation, and the space required to make them happen. The benefits of multi-accessway boulevards include: the humanization and pedestrianization of blighted urban arterials, the creation of perceivable pedestrian spaces from the side medians to the edge of the right-of-way, and the creation of visually harmonious roadway experiences for all modes of transport. Boulevards provide side access lanes that are often safer for property access adjacent to the right-of-way, when compared to fast moving urban arterials where vehicles must slow amidst traffic to exit the right-of-way.

BUS RAPID TRANSIT

Bus rapid transit (BRT) systems were first introduced in Curitiba, Brazil by Mayor Jaime Lerner in 1974. Sometimes known as "surface subways" BRT systems usually occupy dedicated lanes at the center of large urban arterials, with specially tailored stations that allow riders to board and disembark the articulated buses in rapid manner, similar to the boarding associated with subway systems. BRT systems combine this rapid loading and unloading with dedicated lanes to remain disencumbered by traffic congestion to retain subway/light rail-like speeds. Speed of the system is influenced greatly by off-board fare collection systems, the ability of the buses to move at higher speeds than adjacent traffic, and bus priority at intersections. The number of station stops varies with BRT systems, but is nominally similar to light rail systems that are spaced approximately at half-mile intervals. The other great benefit of BRT systems is their lower-cost of development compared to light rail and subway lines.

However, costs do exist with respect to BRT systems and should not be down-played. The costs of BRTs are associated with a differentiated multi-car articulated rolling stock of higher quality than standard bus rolling stock, sunk capital costs with development of the dedicated laneways, specialized station design, and re-timed signalization at intersections. BRT rolling stock can be fueled by any number of power sources, including: overhead electrification, fossil fuels, natural gas, or battery-powered recharge plates embedded into the roadway surface. However, if not designed and developed to a higher standard of quality than regular city buses, the systems have the potential to lose any special cachet that might be brought by introducing higher cost streetcars or light rail. Another

Bus Rapid Transit example: the BRT in Cleveland, OH

Bus Rapid Transit example: the BRT system in Curitiba, Brazil

Streetcar example: City streetcar in Portland, OR

Heritage Streetcar example: traditional style streetcar in Tampa, FL

downside to BRT development is the amount of right-of-way width required to install them. With dedicated lanes, lane removal is typically required, which will cause greater levels of vehicular congestion, even with running the BRT systems at capacity.

After the success of the Curitiba BRT System, known locally as the RIT: Rede Integrada de Transporte (Integrated Transportation Network), other BRT systems have emulated the Curitiba model and eventually adapted those lessons to the local scene, including: Bogotá, Colombia's TransMilenio; Lahore, Pakistan's Metrobus; Johannesburg, RSA's Rea Vaya; and over 170 other systems around the world. In the USA, New Jersey's Lincoln Tunnel XBL and Los Angeles Metro's Orange Line in the San Fernando Valley are the pilot projects that will impact BRT uptake in this country. With the BRT systems that have been built in the USA, average capital costs per mile are about 20% of LRT systems. With respect to streetcar development, BRT systems run about 54% of the cost of streetcar installation per mile. Tradeoffs exist however with BRT systems, which typically have higher overall lifetime maintenance costs (engine maintenance and tire replacement) and higher fuel costs (when operated using fossil fuels or natural gas) when compared to streetcars or LRT systems.

STREETCAR OR TRAM

The use of the term 'streetcar' is used particularly in North America, and often used interchangeably with the term trolley.' Throughout the rest of the world the term 'tram' is used more often. Streetcar systems are often confused with light rail train systems (LRT). Definitionally, streetcars are different from light rail systems in the following ways:

1. Streetcars are typically lighter in weight and shorter in length than rolling stock used in light rail systems. Streetcar systems frequently utilize single car configurations, rather than articulated or multiple car strategies used in light rail systems;

2. Streetcars are typically operated in mixed traffic conditions at grade, whereas light rail lines are more typically mode separated in their own lanes and alignments. At times light rail lines are also frequently integrated with mixed traffic conditions due to difficulties in routing and intersection design;

3. Streetcars function as urban circulators with more frequent stops and simpler station design than light rail, which typically serves more regional destinations; and

4. Modern streetcar systems are simpler to construct compared to light rail, requiring less infrastructure and time. Construction of streetcar lines is usually confined to the trackway and stop locations, and has a limited impact on surrounding sidewalks or streetscape.

5. A number of different streetcar options are available, depending on tradeoffs in station design. Low-floor cars can be used where cities want to avoid elevated

platforms, or standard height floors can be used where cities want to raise curb heights to allow wheelchairs to roll onto streecars. These elevated streetcar stations result in higher capital costs than low-floor models, where station design is often similar to a standard bus shelter.

From a purely practical standpoint, streetcars seem to be an illogical choice for transit infrastructure investment. They move in traffic and make frequent stops, like buses, yet the technology requires capital investment far beyond that of buses, and even Bus Rapid Transit (BRT). However, the life cycle of a streetcar can outlast the life of a bus several times over. Cost of operation and upkeep of streetcars is less than bus fleets in fuel and tire savings alone. The appeal of streetcars lies in their placemaking ability, their capacity to infuse a city or neighborhood with a sense of uniqueness that helps to create "place". That sense of uniqueness is rooted in a romantic association many people have with streetcars that buses and other forms of transit lack. While a perception of romantic uniqueness is difficult to quantify, it cannot be ignored in research on streetcars, because it is the very essence of the modern streetcar movement and a catalyzing incentive to spur new development along streetcar corridors.

There is currently a streetcar renaissance taking place in North American cities, with approximately 18 streetcar systems (broadly defined) in operation and dozens more proposed, planned or under construction. As cities attempt to combat the negative effects of decades of sprawl, streetcars are seen as an infrastructure investment with the power to restore economic and social health, as well as vitality to inner city neighborhoods. Interest in urban light rail preceded the current wave of streetcar development. Dissimilar to the many modern light rail systems introduced in many cities, are the heritage lines catering to tourist and retail riders. More than 30 cities have introduced these heritage lines that run historic streetcar stock to evoke nostalgia for days-gone-by. A modern streetcar is different from historic trolleys or heritage lines: modern streetcar systems employ state of the art vehicles and amenities for a quiet, clean, and efficient ride.

Streetcar renaissance began in earnest with Portland's development of the North-South line that extends from Portland State University into the Pearl District in 2001. The success of this pioneering streetcar line has exceeded all expectations in terms of ridership, development impacts, and quality of life improvements. This North-South Line has become the go-to case study and model for new streetcar development for cities across North America. Since the success of the Portland Streetcar, several other cities are constructing new streetcar systems. Seattle followed Portland in 2007 with the development of the South Lake Union Trolley. The Obama Administration gave support for new streetcar development to the Federal Transit Administration in 2009. Since then support has been extended to other new lines that have opened up across the country. Portland introduced a second line in 2012 (the Central Loop) that crosses the Willamette River, connecting a significant area of the city with the downtown. New Orleans is on a current

Tram example: older model tram in Berlin, Germany

Supertram example: new model tram in Sheffield, England

Light Rail example: The Tide LRT in Norfolk, VA

wave of expansion, with the Loyola/UPT line recently opening in 2012. Planning, funding, and construction are proceeding apace for several new streetcar systems or expansion lines scheduled to open between 2013 and 2016. These include the following cities: New Orleans' French Quarter Line, Seattle's First Hill Line, Tuscon's Sun Link Line, Atlanta's Peachtree Line, Washington DC's H Street NE / Benning Road Line, St. Louis' Delmar Loop Trolley, Fort Lauderdale's Wave Streetcar, and the Tempe Streetcar. The City of Los Angeles is experiencing tremendous interest in the re-establishment of its streetcar system, which was the world's largest urban rail system in the 1920s, with over 220 miles of inner-city Los Angeles streetcar service, and several hundred miles of regional service; all of which were powered by electricity. Los Angeles' immense streetcar and electric railway systems were lost to the rubber-wheeled bus movement and the nefarious 1949 buy-out of the Pacific Electric/Los Angeles Railway/ Red Car Rail system by a nine company consortia (including Firestone Tire, Standard Oil of California, and General Motors) in what has become known as the Great American Streetcar Scandal; a scandal which ended streetcar service in over 60 cities across the United States and Canada.

LIGHT RAIL TRANSIT

The term Light Rail was coined in 1972 in the USA under the auspices of the Urban Mass Transit Administration, prior to the advent of the Federal Transit Administration. In 1977 The Transportation Research Board (TRB) defined "light rail" as "a mode of urban transportation utilizing predominantly reserved but not necessarily grade-separated rights-of-way. Electrically propelled rail vehicles operate singly or in trains. LRT provides a wide range of passenger capabilities and performance characteristics at moderate costs." Definitionally, light rail systems are different from streetcars in the following ways.

1. LRT rolling stock is typically heavier in weight and longer in length than rolling stock used in streetcar systems. However, compared to heavy rail systems, the trains tend to be lighter and quieter in operation. LRT systems frequently utilize multiple car configurations, and include articulated cars that allow train capacity to be maximized. Some LRT and commuter rail lines often have upwards of 5-7 cars per train. Many heritage streetcar lines typically utilize single cars with no multi-portal articulation. Some of these older 19th Century streetcar lines continue to operate cars that have seating maximums much smaller than modern buses. A typical modern light rail car in comparison easily holds capacity upwards beyond 200 persons per car;

2. LRT cars are typically operated on fixed rail guideways in dedicated, mode-separated spaces that are free from traffic mixing. At times light rail lines are also frequently integrated with mixed traffic conditions due to difficulties in routing and intersection design. Both Salt Lake City's Trax system, and the San Diego LRT might then be thought of as hybrid systems. LRT systems are typically powered by overhead catenary-based

electrification, to avoid dangerous third rail electrification conditions in dedicated guideways. Some newer systems are powered by diesel fuels however. Interestingly nearly all rail systems in Europe and North America now run on 1.435 meter spaced rails;

3 LRT systems function as regional rail services at higher speeds, but with less frequent stops (typically at distances greater than ½ mile outside of dense urban conditions, and also with less frequent service due to longer headway timing. LRT systems typically sport much larger and complex station design than streetcars;

4 These stations are often specifically designed for the system, and include raised waiting platforms, electronic ticketing and arrival signage, places to sit, information systems, surveillance cameras, and other amenities to make relatively longer headway and waiting times more endurable; and,

5 Modern LRT systems are much more complex to construct compared to streetcar systems, requiring more infrastructure, planning and project design time. As such the per mile cost of most LRT systems is exorbitantly high, coming in at more than twice the cost of streetcar systems.

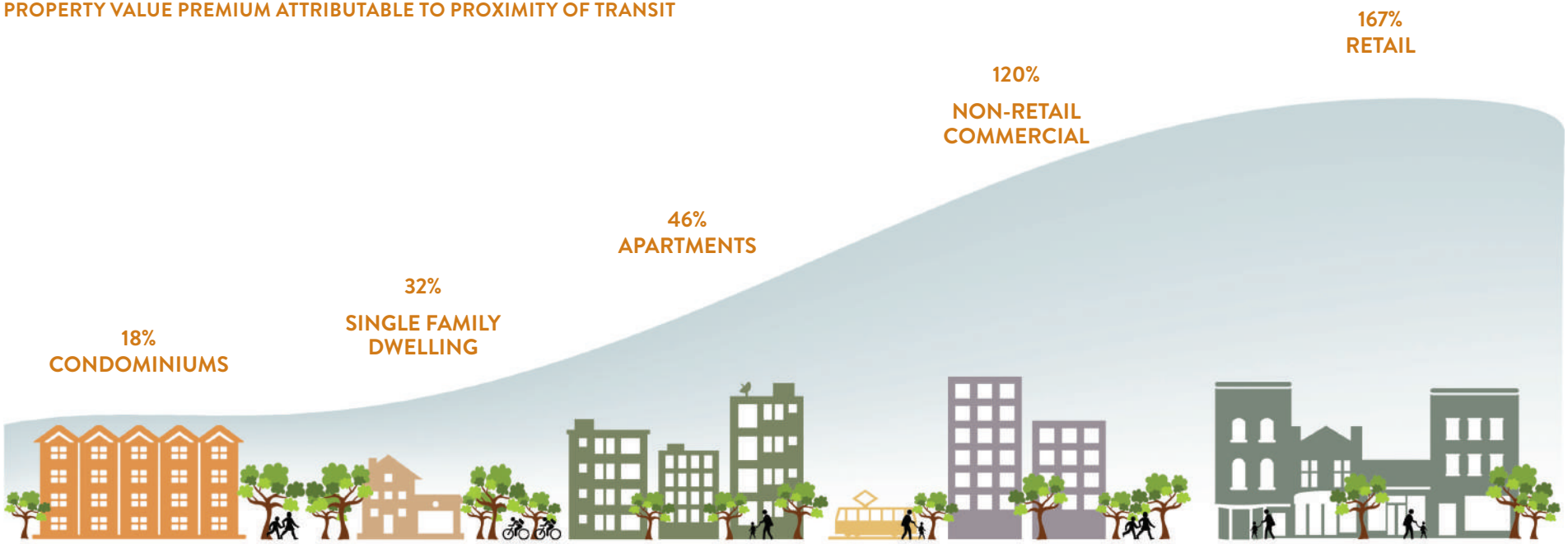
Commuter and Light Rail systems have been in operation in most cities of Europe since the late-19th Century, developing out of existing rail corridors, streetcar or tram networks. The modern light rail system traces its origins to Germany in the mid-20th Century, where the Stadtbahnen now serves most German cities. Similar to the renaissance in streetcar systems in the United States and Canada, Light Right Transit (LRT) has been enjoying a rebirth since the mid- 1970s. While large stretches of the United States and Canada continue to be serviced by commuter rail and railroad suburb systems (large swatches of the Atlantic seaboard and Midwest), 1978 saw Edmonton, Alberta Canada open the first new Light rail system in decades. Since then over 30 LRT systems have been constructed in North America.

The following table provides a cursory comparison of the four transit modes considered in this monograph. This table categorizes the differences between standard bus, bus rapid transit, streetcar and light rail transit. These are then presented by means of System Characteristics, Vehicle Characteristics, and Station Design + Construction. This information was culled from several different transit agency and transit websites.

Light Rail example: The METRO in Houston, TX

Light Rail example: TRAX LRT in Salt Lake City, UT

PROPERTY VALUE PREMIUM ATTRIBUTABLE TO PROXIMITY OF TRANSIT



Investment in transit increases property values: A recent survey published by the Center for Transit Oriented Development found that there is a measured increase in property value that is near public transit. An American Public Transit Association report backs this statement when they also found that "Real estate -- residential, commercial, or business -- that is served by public transit is valued more highly by the public than similar properties not as well served by transit."

	SYSTEM CHARACTERISTICS				VEHICLE CHARACTERISTICS					STATION DESIGN + CONSTRUCTION		
	RIGHT OF WAY	OPERATION	STATION SPACING	FUNCTION	CAPACITY	LENGTH	SPEED	TURNING RADII	VEHICLE COST	STATION DESIGN	CONSTRUCTION COST	TRACK CONSTRUCTION
BUS	Mixed Flow	Operated as a single vehicle	0.2-0.5 miles	Local & Inter-city Service	50-75	40 ft	Max. 65 mph	Min. 45 ft	$450k-550k	Simple	N/A	N/A
BRT	Primarily Exclusive	Operated with articulated multiple vehicles	0.5-1 mile or more	Mid-Level Demand Regional Service	50-130	40-80 ft per car	Max. 65 mph	Min. 60 ft	$450k-550k per car	Station Platform	Average 13.5 million per mile	Shallow Slab: 8-12 inch
STREETCAR VEHICLE	Primarily Mixed Flow	Operated as a single vehicle	0.2-0.5 miles	Urban Circulator	75-200	45-80 ft	Max. 45 mph	Min. 60 ft	3 million	Simple like bus stop	Average 25 million per mile	Shallow Slab: 12-18 inch
LIGHT RAIL VEHICLE	Primarily Exclusive	Operated with multiple vehicles	0.5-1 mile or more	High Demand Regional Service	235 per car/ Trax	80-100 ft	Max. 55 mph	Min. 90 ft	3-4 million	Station Platform	Average 65 million per mile	Full Depth: 3-6 ft

Chart showing general differentiations between a bus, streetcar, BRT, and LRT: these are generalizations and are not specific to the design proposals or the Cottonwood Heights costing

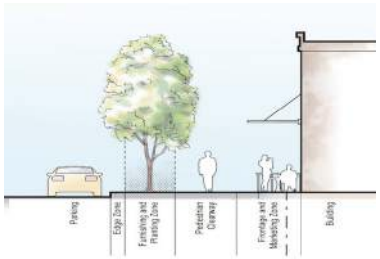
VEHICLE LENGTH COMPARISON

BUS 40’

ARTICULATED BRT BUS 40’-80’

STREETCAR 45’-80’

LIGHT RAIL 80’-100’ PER CAR



IDEA Streetscape improvements can include several elements: the addition of street trees as well as alterations in planting patterns to add visual distinction to intersections. Sidewalk widening, improved lighting, public art, seating and gathering spaces, bicycle lane improvements as well as theming and wayfinding design are all part of what can be used to improve the streetscape

STREETSCAPE IMPROVEMENT PROPOSAL

OVERALL DESIGN

The Streetscape Improvement Proposal for the City of Cottonwood Heights was the least intensive both monetarily and physically for the transit improvements. The proposal for creating an avenue along Fort Union Boulevard came after many attempts to create something feasible and functional. The avenue will extend from Bingham Junction to Wasatch Blvd spanning 6 miles. It will change the flow of traffic on Fort Union Boulevard by reducing speed while still maintaining the same number of lanes. The proposed avenue will create a sense of place for all modes of transportation and give the corridor an aesthetically pleasing feel and look. With renovation of this key arterial the entire area will see many benefits.

DESIGN NARRATIVE

The Studio approached the design of Fort Union Boulevard with a number of proposals. Slowly over the course of a few weeks, and after a feasibility round table discussion with the faculty and professionals, the Studio narrowed down the options and chose to go with the streetscape improvement proposal. The Streetscape Improvement Proposal calls for the use of the existing right-of-way (ROW) to make the improvements. It calls for the same number of travel lanes but instead of having them be 12 to 13 feet wide they would be consistent at 11 feet across the way. A 5 foot separated cycle track was added to each side of the street. These cycle tracks change in pavement and painting patterns when approaching bus stops and intersections to alert cyclists of change in movement. A 10 foot vegetative median with honeylocust trees would run down the middle of the street, which turns into an alternating left turn lane at all intersections. Improved bus stops would be scattered at various spots along the corridor. The 9 foot sidewalks are on both the north and south side of Fort Union, also lined with honeylocust trees. The design arrived at aimed to transform the street from a barren slab of asphalt currently being used as a throughway, to make it an interesting, inviting, desirable street for all modes of transportation.

CROSS SECTIONAL AND INFRASTRUCTURE REALITIES

Fort Union Boulevard has a few constraints that were considered while drafting the streetscape design. First is the right-of-way; in some areas it can be as wide as 127 feet (i.e. 1300 East) and as narrow as 75 feet (i.e just east of 2300 East). The average size width of the ROW was about 85-90 and that number was relatively consistent throughout Fort Union. Another physical constraint were the Rocky Mountain Power poles that are about 5 feet wide at the base and that up to 65 feet in height. Due to this, if development were to take place along Fort Union, a 10 foot set back would be required so that the electrical wires would not interfere with the upper stories of future buildings.

STREETSCAPE IMPROVEMENT PROPOSAL

The Streetscape Improvement Proposal, first and foremost, is an easy way to increase pedestrian and bicycle activity along Fort Union Boulevard. The addition of trees is the most cost effective way the city of Cottonwood Heights can improve the street. Trees shade people on the street and provide a sense of character and place along Fort Union Boulevard. The addition of trees also minimizes the overpowering view of the large grey utility poles that are located along the road. Since we know these poles are too expensive to relocate underground, street trees are a effective way to reduce their presence. The addition of trees is also an easy way to mitigate the urban heat island effect within the city. They will cool the area, making walking and biking more viable.

The addition of a bicycle track on both the north and south side of the street allows for even easier access into the canyons. As its name, "The City Between the Canyons" describes Cottonwood Heights as an area desirable for people who want convenient access to outdoor recreation. Cycle tracks emphasize the dedication the city has to its residents and the outdoors amenities Utah has to offer. Because the cycle track is located between the sidewalk and the median it is safer for bicyclists. They do not have to worry about vehicular traffic encroaching on their space. Another way the proposal mitigates accidents between automobiles and bicyclists is by having the cycle track raise to the same height as the sidewalk at bus stops. The slight raise along with signage gives the bicyclist and bus driver an indication that increase diligence in necessary in that are. The bicyclist must also pay attention because pedestrians will be crossing the cycle track at bus stops. The bus stop is ADA compliant and easy to access to all people.

Overall, the streetscape proposal is the least expensive way to improve Fort Union Boulevard. Street trees bring an identity that is lacking along the street, while providing shade and cooling pedestrians and bicyclists. Trees help mitigate the urban heat island effect caused by large parking lots. The addition of a cycle track improves the connection from Cottonwood Heights to the canyons to the east. It allows for easy and safe access for both the bicyclist and the passing traffic.

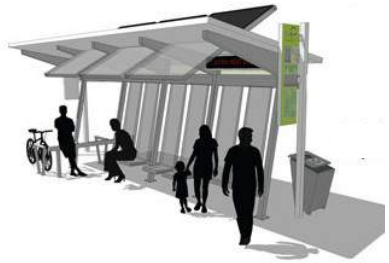
This proposal also does not reduce the number of traffic lanes on Fort Union Boulevard. The lanes are not as wide, which will cause traffic to travel at a slower rate. The city of Cottonwood Heights has expressed the desire to make the city a destination instead of a thoroughfare. Reduced traffic lanes will allow businesses to be more visable from the street.

IDEA Streetscape improvements can include a cycle track and pedestrian lighting: these changes can have a quality impact to the street and improve the safety for both pedestrians and cyclists

Streetscape improvements as proposed at the intersection of Highland Drive and Fort Union Blvd: a center lane median planted with street trees as well as a resonate pattern of trees lining the street will dramatically improve the visual quality

Section of streetscape improvements as proposed at Highland Drive: By keeping the lanes of traffic to two lanes in each direction a cycle track can be implemented. Pedestrian lighting, street trees and the cycle track will improve the quality and usability of the street for all users

BUS BOULEVARD



IDEA Bus stop elements should help to create a comfortable experience for the rider: overhead protection from the elements should be considered an important factor given the Utah climate. In the above example the roof serves as an energy source for the electric sign that notifies users of arrival time of the bus. Seating, waste bins and lean bars likewise add to the desirability of the stop

The Bus Boulevard Proposal divides the ROW into functional uses. Space is given for through traffic, pedestrians and cyclists, and local access traffic. Boulevards are often identified by their access lanes. These lanes operate at lower speeds which promotes bike and pedestrian security. Starting at the center of the road and moving outward, the Bus Boulevard has a middle left-turn lane, followed by one lane of travel in each direction, then a median for luminaires and trees. The rows of trees give the street a sense of enclosure. Next is the 17 ft access lane, then a 10 ft zone for planters, bus stops, street furniture, bike parking, and sidewalk that extends another 12 ft to the apron of buildings or property lines.

The through lanes allow for the main portion of the east-west traffic to travel with no interruption from bus or other transit. The left-turn lane not only provides pockets for the left turns but also may act as a passing lane for emergency vehicles. The access lane is the designated bus corridor. This lane is wide enough for a bus to arrive at a bus stop and still allow other vehicles to go around it unhindered. However, it is only one lane, but it is meant to be shared with cyclists since the access lane has lower speed limits.

This alternative provides the City of Cottonwood Heights with a street design that is rare in the United States, but has been proven valid and desirable in places where the boulevard has been implemented. The boulevard provides some flexibility in the ROW requirements. Medians can be trimmed down substantially if trees do not have to be planted in them. Conversely, the boulevard can be made even better with larger ROW. The design shows the typical ROW in section at 97 ft. However, many of the popular boulevards around the world are often over 100 ft, with some wider than 200 ft. Additional width gives the pedestrian more space and amenities. Lowering the ROW would result in a less pleasant and inconsistent street element.

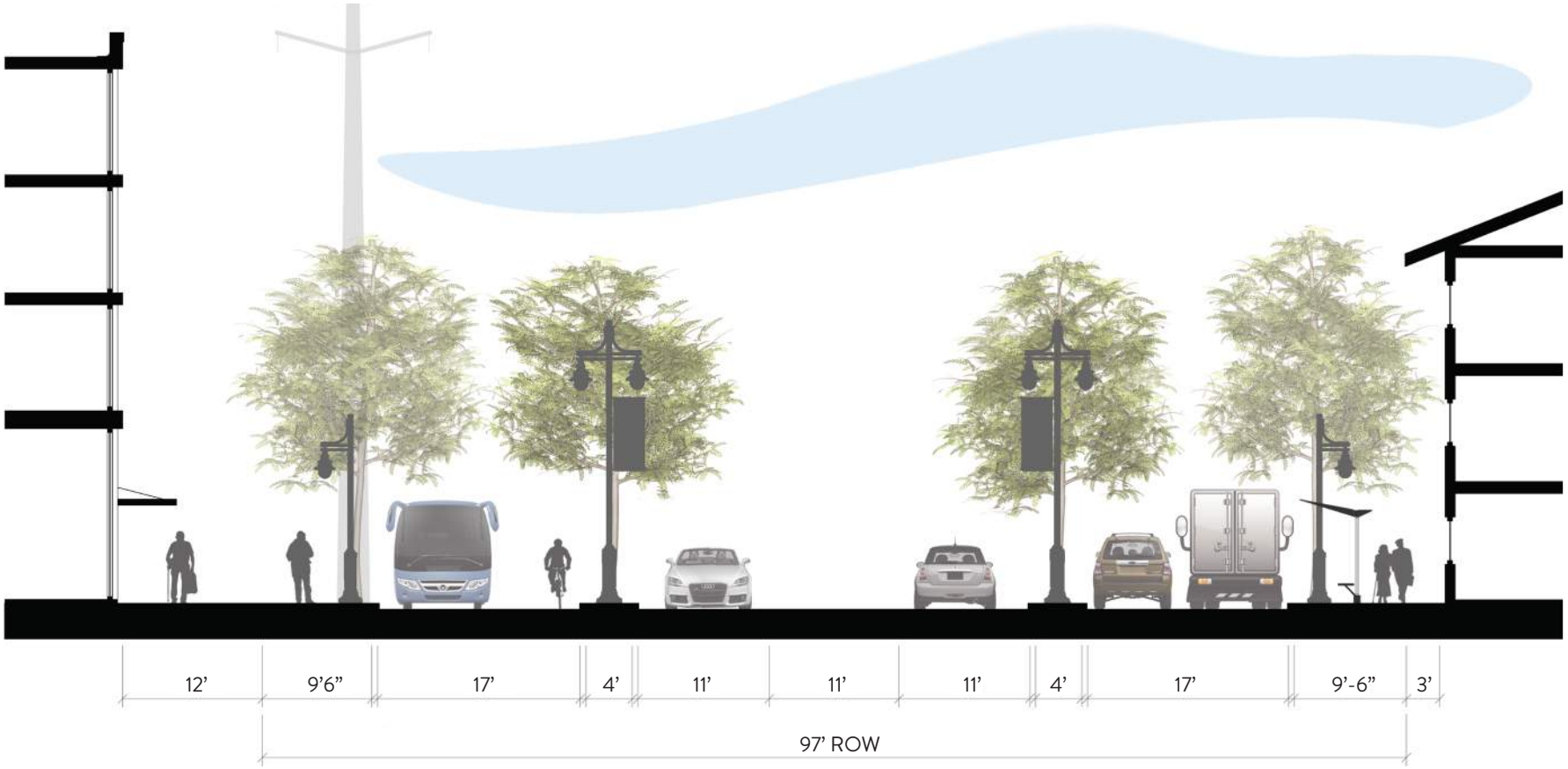
Boulevards require a major change of driving behavior. The medians block many left turn movements, which may be desirable in some situations and less desirable in others. Left turns out of retail centers is controlled and limited. Furthermore, right turn movements begin to create more conflict points with the access lanes. Drivers must enter the access lane at designated entrances. This requires additional trip planning, but drivers adapt to this quickly since the new driving patterns are simple.

The Bus Boulevard offers Cottonwood Heights a unique and identifiable street with little more than vegetation maintenance and watering. It could function fully with the current rolling stock and no placement of rail or other infrastructure lines. Thus it is one of the least expensive alternatives.

IDEA A rendering from the Franklin Boulevard Redevelopment Project: this proposal from Springfield, Oregon shares several design elements from the proposed Fort Union Bus Boulevard. The image shows the two planted medians that separated the main traffic from the side street. Likewise the bike lane that shares the space with slower traffic and the buses is also depicted

Street tree selection plays an important role in the design process: the trees need to be able to withstand the extra stresses including air pollution, limited air and water for roots, and damage from passing vehicles. Trees such as Honeylocust and Flowering Pears are suitable for such conditions and add beauty to the street

The Bus Boulevard at the intersection of Highland Drive and Fort Union Blvd: the proposal provides tree lined medians on the street that create two side streets for buses and slower traffic. There is a strong visual impact created from this design proposal that would create a strong identity for the street



A section of the Bus Boulevard at Highland Drive: the slip streets allow separation for the buses as well as a space for cyclists. The main traffic flow is focused to the center of the street with one lane in each direction and a turn lane. Because the buses are situated away from the flow of traffic, frequent stops for the bus do not inhibit or slow down the cars

STREETCAR OPTIONS

STREETCAR PROPOSAL 1

IDEA Center lane pedestrian medians: examples can be found such as Allen Street in New York City or State Street in Chicago. These medians help to calm traffic, provide space for street trees, places to sit and relax as well as a safe place for pedestrians and cyclists to travel

A design concept designated “The Stollevard” has been designed to provide a unique alternative to a traditional streetcar configuration. This scheme places a large pedestrian corridor through the center of the street. In doing so, space is created for pedestrians to walk, cycle and sit. In larger areas such as major intersections, the right-of-way allows for a larger pedestrian space, essentially creating a plaza in the center of the street. This plaza can serves a location for small vendors, such as coffee or pastry carts. The small shops are readily accessible to the streetcar stops located on either side of the road. By placing the pedestrian zone in the center of the street the design gives ownership back to people as opposed to the typical roadway dominance of the vehicle.

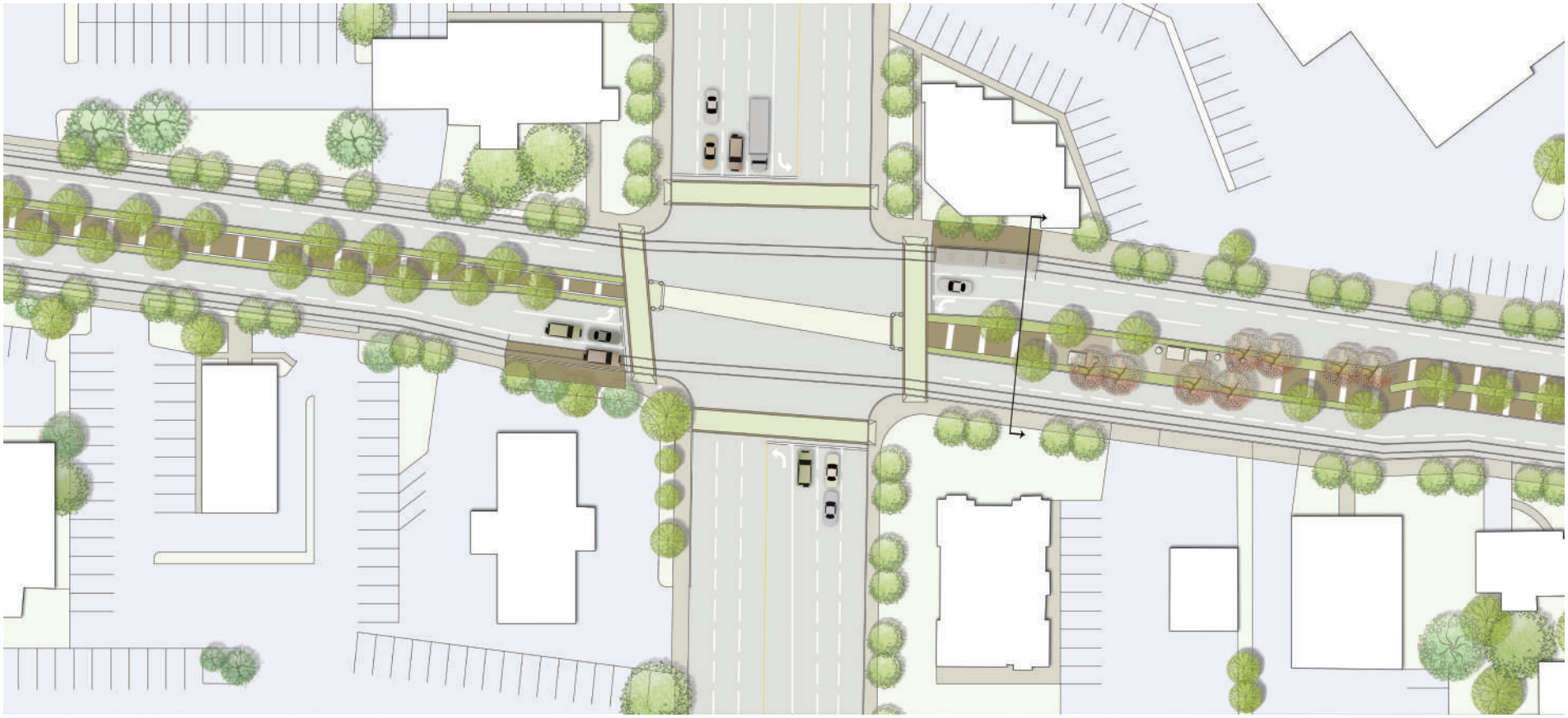
Traffic lanes are kept to 2 lanes in each direction, with the far right lane being shared with the street car. Street trees line The Strollevard, creating a shaded and attractive space for users. Likewise, pedestrian lighting further accommodates the users and creates a visual resonance on the street. The pedestrian space is raised similar to a sidewalk and is also buffered by colorful planting. This provides safety for the users as well as adding visual appeal to the street.

The concept can best be utilized at the identified nodes for redevelopment as well as any other commercial business intersections. In doing so the public realm is expanded, the area as a whole becomes more pedestrian oriented and the street becomes an important connectioning point.

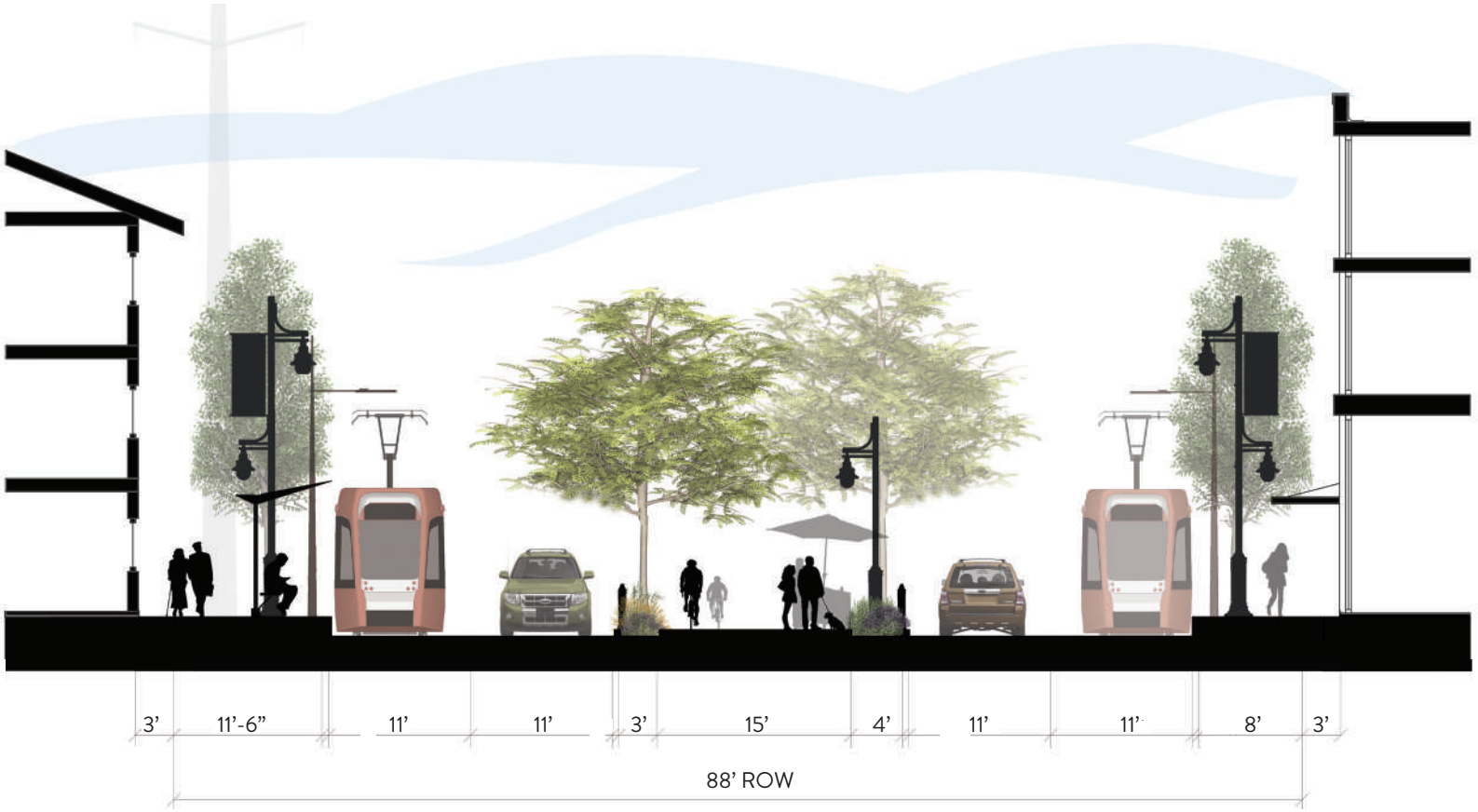
As Fort Union Boulevard moves east and the surrounding uses become more residential the strollevard can be minimized. The right of way improvements could include a larger sidewalk, improved street trees as well as a cycle track. The Strollevard is a flexible concept and the design can adapt appropriately depending on the different nodes of Fort Union Boulevard. Similarly, the deign can be implemented incrementally and funding becomes available for the streetscape and redevelopment projects along the street.

Rendering of The Strollevard Proposal at the corner of Fort Union Blvd and 1300 E: New restaurants, shops and housing bring users in from the street through a new plaza space and pedestrian promenade out to the street. The 'Strollevard' creates an additional gathering space across from the plaza as it runs down the center of Fort Union Blvd. A streetcar stop creates easy access to residents and visitors of the area

STEETCAR CONFIGURATION 1: THE STROLLEVARD



The plan for The Strollevard transit design concept: This configuration places a large median in the center of the street that functions as a place for cyclists, pedestrians, as well as seating and dining. The design carries the function of a plaza and carries it down the middle of the street. Like the Meadow Line the streetcar shares a lane of traffic on either side of the street



The section for The Strollevard concept: shows the design can function in even a smaller right-of-way as is often found on Fort Union Boulevard as the street travels east. The center pedestrian median provides space for perennials and trees as well a seating and room for food vendors

IDEA Planted center lane medians: are opportunities to not only improve the aesthetic quality of the street but likewise can improve the water quality by utilizing the planting beds as bioswales

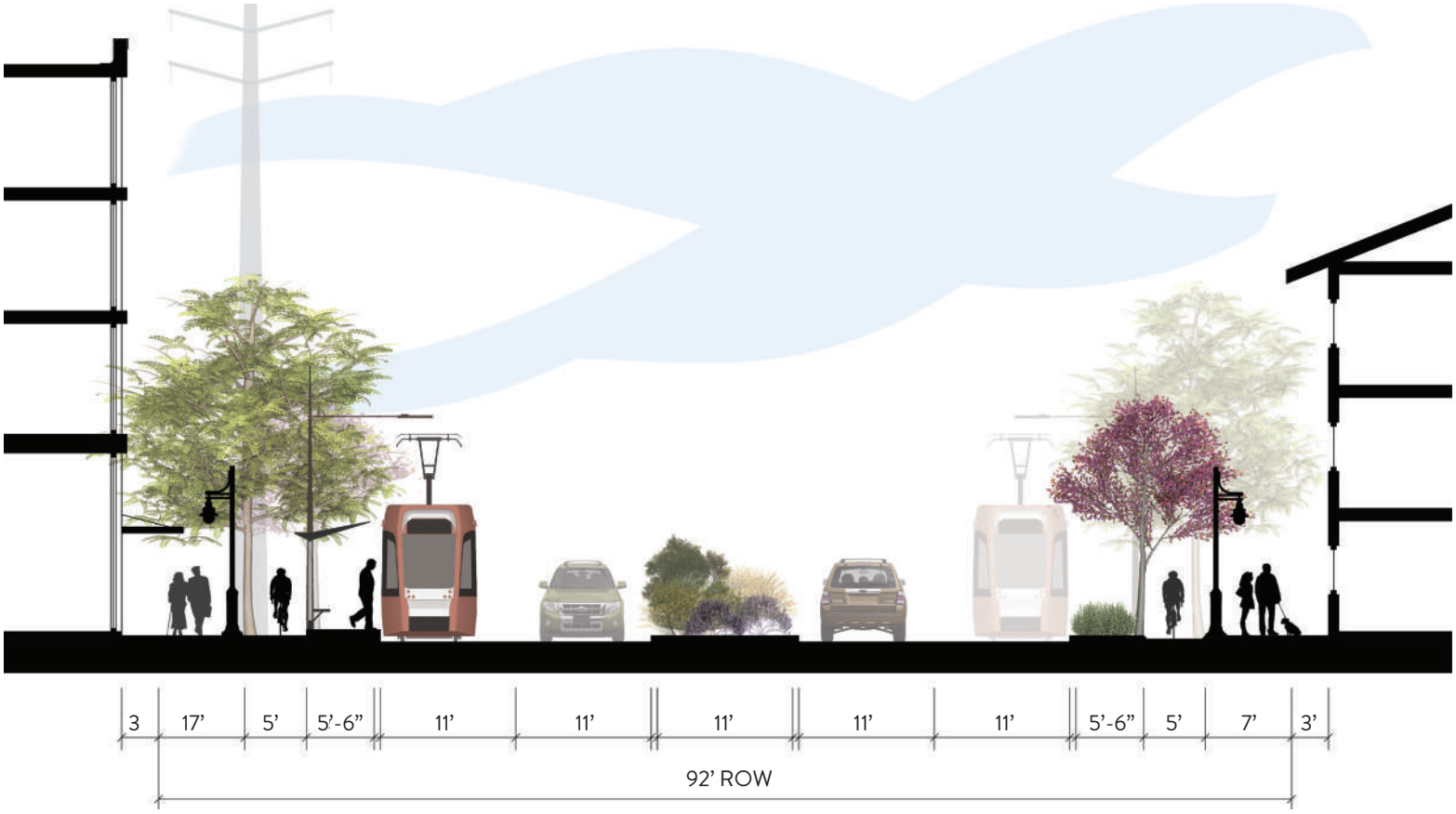
THE MEADOW LINE CONFIGURATION

The Meadow Line is the first proposed streetcar configuration for Fort Union Blvd. This proposal follows a relatively standard model for streetcar alignment. In this plan the streetcar track is located in the far right lane on either side of the road. This allows vehicles to share this lane of traffic with the streetcar as they would with any other vehicle. Travel lanes are reduced to 11' wide. Reducing the width of each lane by 1' allows for more room for the sidewalk to expand.

This proposal works well with the current right-of-way configuration and will not remove any existing lanes of traffic from the road. Left turn lanes will still be provided at intersections as the planted medium is temporarily removed for this purpose.

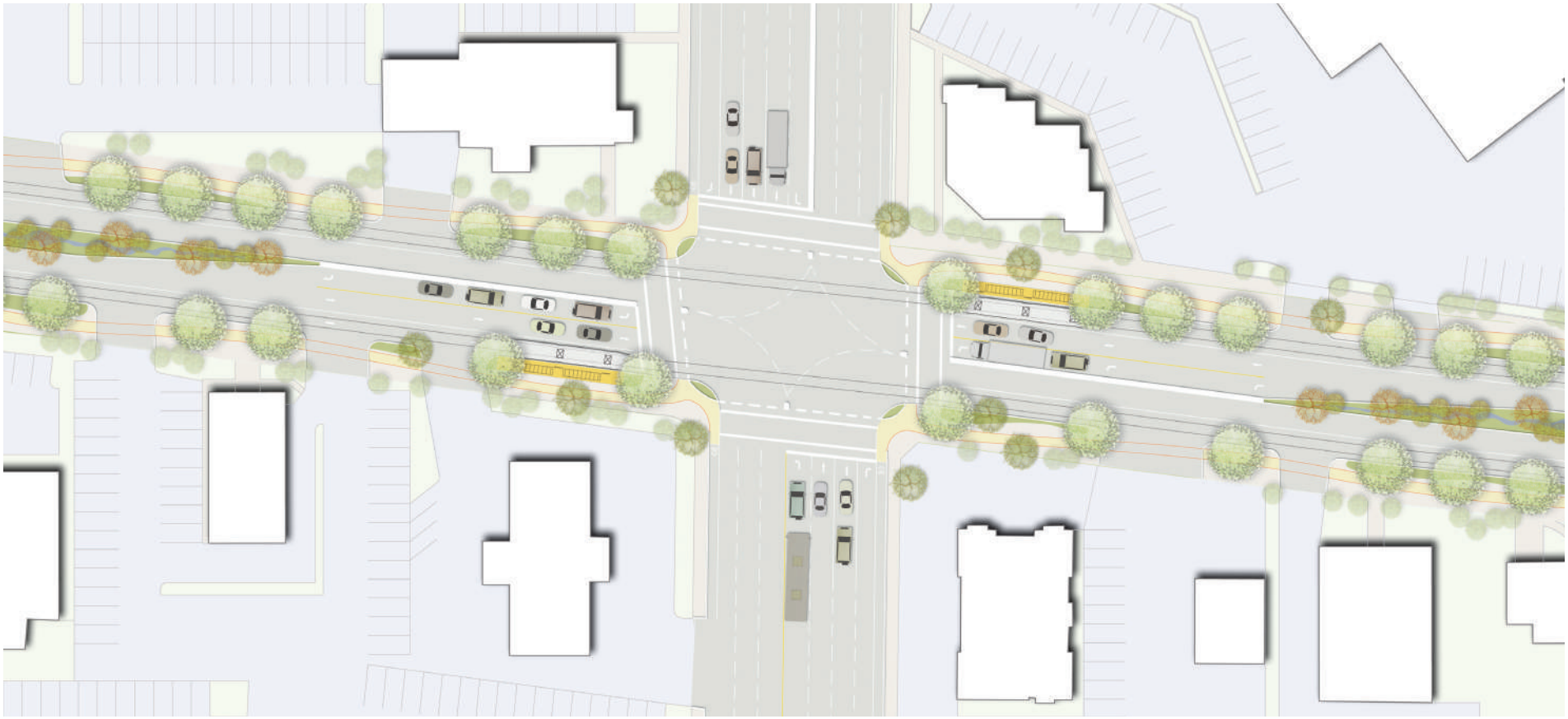
The moniker "Meadow Line" is derived from the planted medium that will run down the center of Fort Union Boulevard. Here native and adapted species line the center of the road in a rich display of color, texture and size. Ornamental grasses, flowering perennials, and small shrubs will be used to provide year-round interest. The planting scheme for this proposal is more organic than the traditional row of trees. Trees along the sidewalk will not necessarily follow a rigid line. Rather there will be a mix of types and sizes and placement that still create a distinct canopy, but feel more naturalized and reflective of the surrounding environment.

To improve the street for pedestrians and cyclists, the sidewalks have been expanded and will include streetscaping that reflects the pallet of the planted medium. Additionally, pedestrian lighting will be provided as well as street furniture. A cycle track will run parallel to the sidewalk and provide protection for cyclists. The cycle track will raise to the sidewalk level adjacent the stations and will have markers in the pavement to provide visual cues to both pedestrians and cyclists that both need to be aware of each other and prevent any conflicts. The stations for the streetcar are simple and depending on the type of rolling stock selected, may not require a raised platform.



The street section for the Meadow Line: shows the color added by the planted median. A cycle track runs parallel to the sidewalks on either side of the street. Colorful street trees provide shade and create character for the street

STEETCAR CONFIGURATION 2: THE MEADOW LINE



The plan for the Meadow Line at Highland Drive: places a planted center median that features perennials, grasses and shrubs that add color and texture to the street. The design of street trees has a more organic configuration to add to the overall look that is indicative of the surrounding natural landscape of the nearby canyons. The streetcar runs on the sides of the street and shares a lane of traffic allowing the street to maintain two lanes of traffic in each direction

BUS RAPID TRANSIT

Bus Rapid Transit, otherwise shortened to BRT, is a fast moving bus service that acts similar to a rail service while still being able to utilize the flexibility of not being confined by fixed tracks.

A BRT uses dedicated lanes to maintain route free from impeding traffic from other vehicles. The BRT also is given signal priority to keep the system flowing and minimize frequent stops. The boarding platforms are built efficiently to maintain quick loading and unloading times. As a precedent set in the Curitiba, Brazil BRT, the loading platforms allow users to pay before entering the platform, allowing them to enter the bus without having to collect fares. The tube loading platforms on the Curitiba line are likewise raised so users with restricted mobility may embark or disembark the bus easily and without the need of lowering a ramp.

Given the current right-of-way on Fort Union Boulevard, providing a dedicated two-lane BRT would require widening the road and purchasing additional right-of-way. This could be avoided by reducing the number of vehicle lanes on either side of the BRT, but this did not seem a feasible option and would reduce the quality of service of the road to far below acceptable standards. Given these constraints, the BRT proposal for the corridor is a modified one-way configuration. This proposal provides the dedicated lane for the BRT, however, the routing of the bus will reflect the peak hour conditions to determine its direction of travel.

BRT is intended to act as regional transport, moving riders quickly over a large area. This means that stops will reflect a typical Light Rail model rather than a streetcar configuration which features frequent stops. BRT does have stops at the nodes selected for redevelopment in order to provide easy access to these areas and allow density supporting redevelopment to occur.

The BRT design features landscaped medians, providing trees on either side of the bus lane. This feature will create a dramatic allee of trees that will greatly improve the visual quality of the street and likewise provide much needed identity to the area.

Additional trees planted along sidewalks will likewise provide color and interest to the street and create a far more pedestrian friendly atmosphere. Bike lanes on either side of the street will allow for a greater range of transit options and better connections riders to other parts of the city.

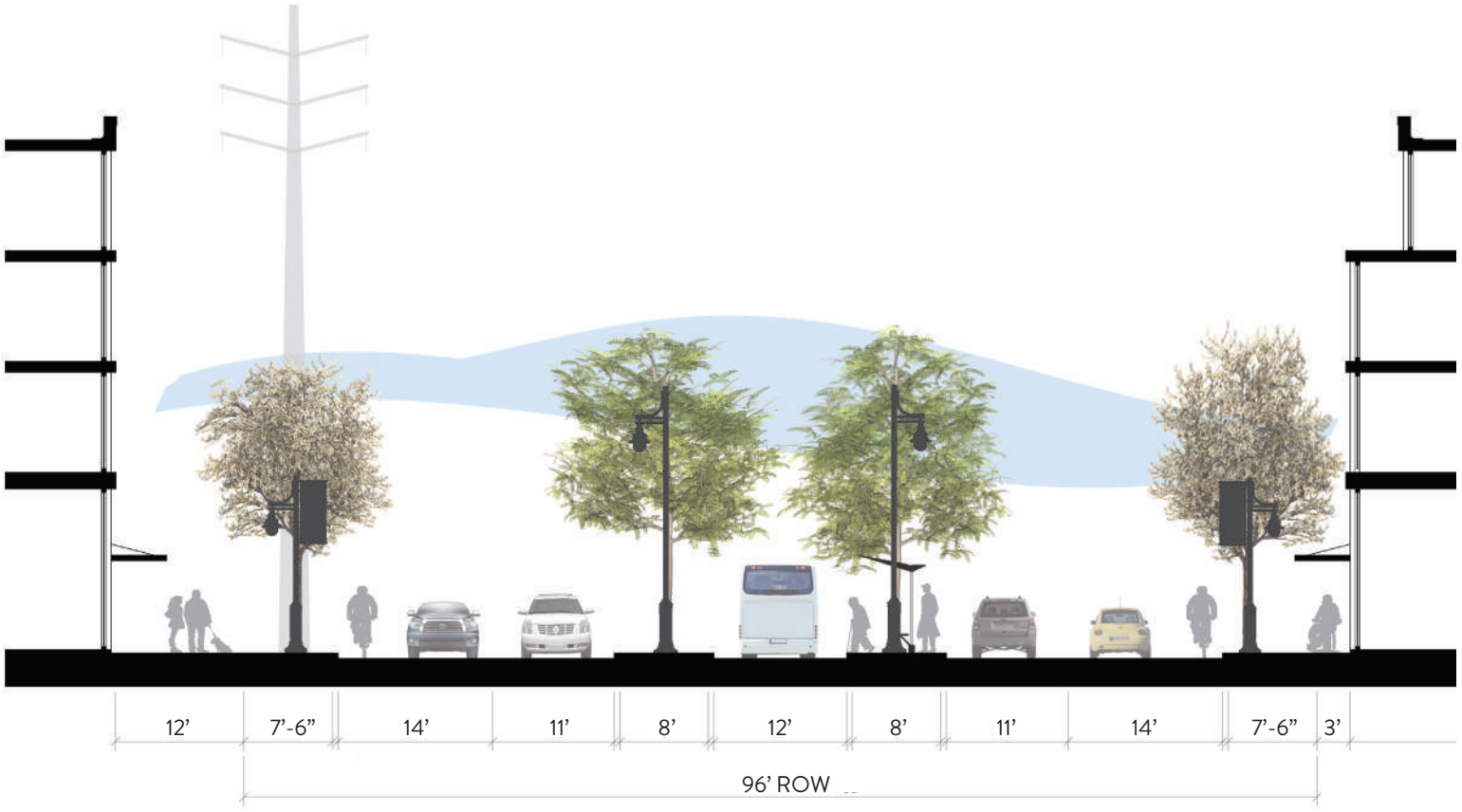
IDEA Fare collection that occurs on the platform saves considerable time: by providing collection kiosks at the station, the time normally spent by passengers paying as they enter the bus is completely eliminated. This method ensures very quick loading and unloading times and makes the BRT system more efficient. UTA has already established these methods, as well as “Tap and Go” for frequent users on their TRAX and FrontRunner systems

Curitiba, Brazil: the intersection of two bus rapid transit lines which has induced high density development around the lines

IDEA A rendering from a BRT proposal in Berkeley, California: much like the proposed BRT on Fort Union Boulevard, this Berkeley BRT proposal likewise features two lanes of traffic surrounding a center lane BRT that travels in only one direction. The Fort Union proposal will allow enough room for left turn lanes will still occur at intersections, which are not depicted in this image.

IDEA transit lines create an opportunity to install public art: local artists are often commissioned to create sculptures at transit stations. Some are integrated directly into the station cover itself or are stand alone pieces. There are many such examples found in Salt Lake City on the TRAX line

The Bus Rapid Transit plan for Fort Union Boulevard: in this configuration the center lane of the street has been designated for the BRT system. This design still allows for two lanes of traffic in each direction as well as left turn lanes at intersections. This BRT design moves in one direction rather than a more typical design of two buses moving in each direction. The designation of the direction can be determined with the demand of peak hours



A section of the Bus Rapid Transit plan for Fort Union Boulevard: shows the center lane loading platform for the buses. A bicycle lane runs down each side of the street. Given the size constraints for a majority of the street, the design utilizes a one way bus boulevard in order to avoid having to expand the width of the road

LIGHT RAIL

IDEA the track bed is a design opportunity: examples of this are Houston's LRT line where the train moves through a fountain. When the train has cleared the fountain the jets turn back on. Another more common example is landscaping the track bed. In this region using sedum is a waterwise and attractive alternative to grass

The introduction of a light rail system to Fort Union Boulevard in Cottonwood Heights would provide catalytic change to what is now a vehicular corridor rampant with seas of parking, strip malls, and sprawling land uses. The people of Cottonwood Heights greatly value the relative isolation and tranquility of their residential neighborhoods. With the population of Salt Lake Valley expected to dramatically increase over the next 20-30 years, those neighborhoods will be in danger of compromise and traffic along Fort Union Boulevard will only increase. If no plan for accommodating a healthy amount of population growth within Cottonwood Heights is put into place, the city will become nothing but a pass-thru for people headed to other destinations, leaving the city with many of the disadvantages associated with population growth and few of the benefits. Introducing light rail to Fort Union offers a solution to these issues in a number of ways.

Studies have shown that light rail systems ideally operate in areas with a density between 20 and 30 dwelling units per acre. By establishing density zones around stations, Cottonwood Heights can accommodate a substantial increase in population without compromising the single family detached residential neighborhoods that many residents cherish. Compared to street car and regular bus lines, light rail is a faster and more efficient transportation mode that covers more distance in less time and better supports commutes. Trips of shorter duration and an increase in destination accessibility will be more attractive to commuters and people looking to connect to the ski bus and recreate in the canyons, which will draw a variety of people to reside in the transit the transit oriented developments along Fort Union. Higher concentrations of residents that come with dense development will increase tax revenue for the city and assist in creating memorable places and destinations; this will help establish Cottonwood Heights as much more than a thoroughfare.

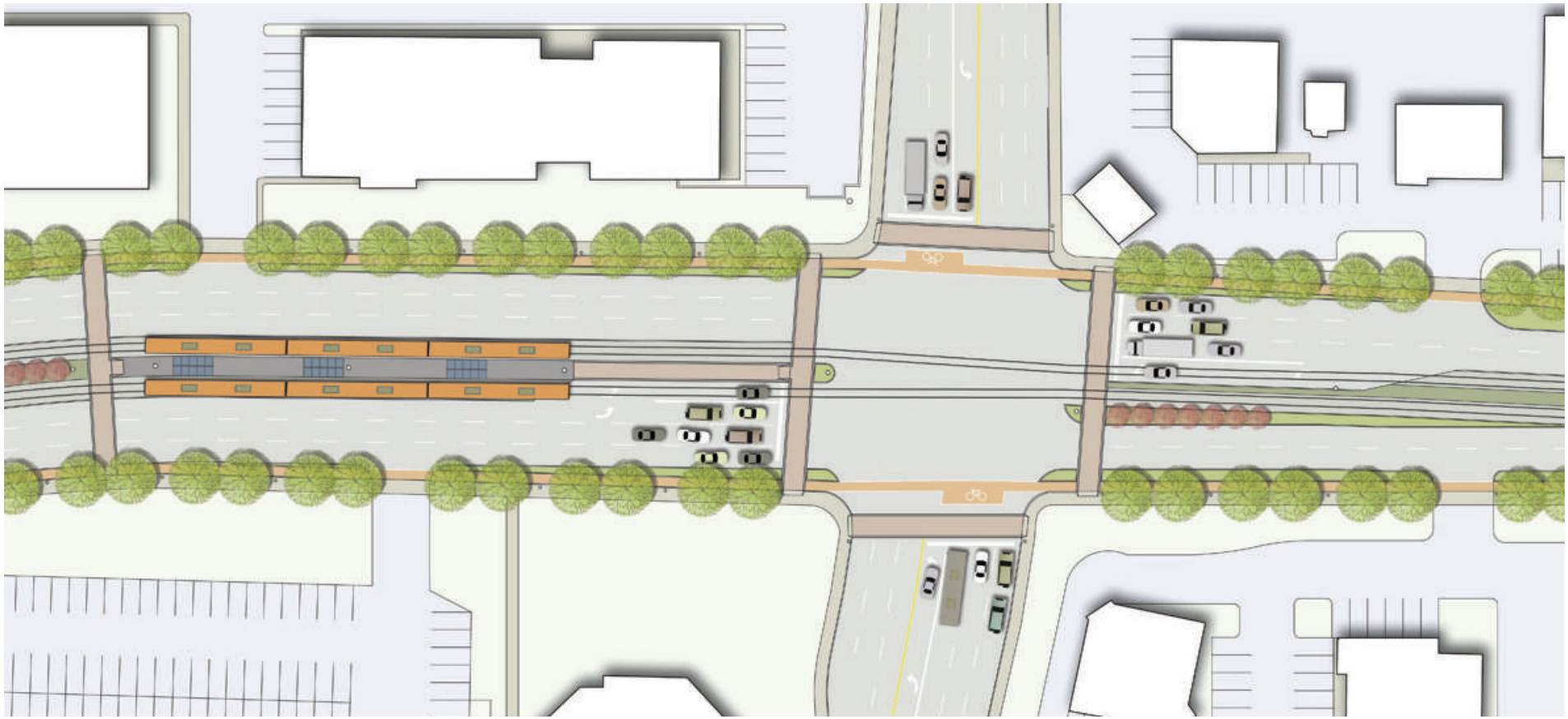
The proposed light rail line is a center-loading system, which follows the precedents set by existing Trax lines in Salt Lake Valley. The center loading platform will fit into the public right of way in most situations along Fort Union Boulevard. Right of way, however, is not wide enough in certain instances, which requires additional measures to be taken. The city can purchase additional right of way from property owners in necessary locations. Spots where this becomes necessary are, for the most part, only at the light rail stops themselves. One proposed track alignment can minimize the right of way usage of the LRT by constructing a shared-rail concept, also known as a slip lane or rail. In the shared-rail concept, two sets of tracks would merge into one as they approach the station. In doing so, the space required for the second track is filled by the loading platform, saving 12+ feet of right of way to be used for other purposes. This concept would obviously require coordination on the side of UTA to have trains timed such that time waiting on another train is minimized or eliminated. Our study suggests this 'shared-rail' concept be employed at stations where Fort Union intersects Highland Avenue and 2300 East. Take note that while a shared-rail concept could minimize right of way takings, it will not altogether eliminate them. Simply fitting one set of tracks in each direction with

no reductions several set of tracks in each direction with no reductions in vehicular traffic lanes would exceed existing ROW along several stretches of Fort Union, specifically on parts east of Highland Drive and in the residential section east of 23rd. In addition, the shared-rail concept has not been done before by UTA and they currently have no standards in place for such a system.

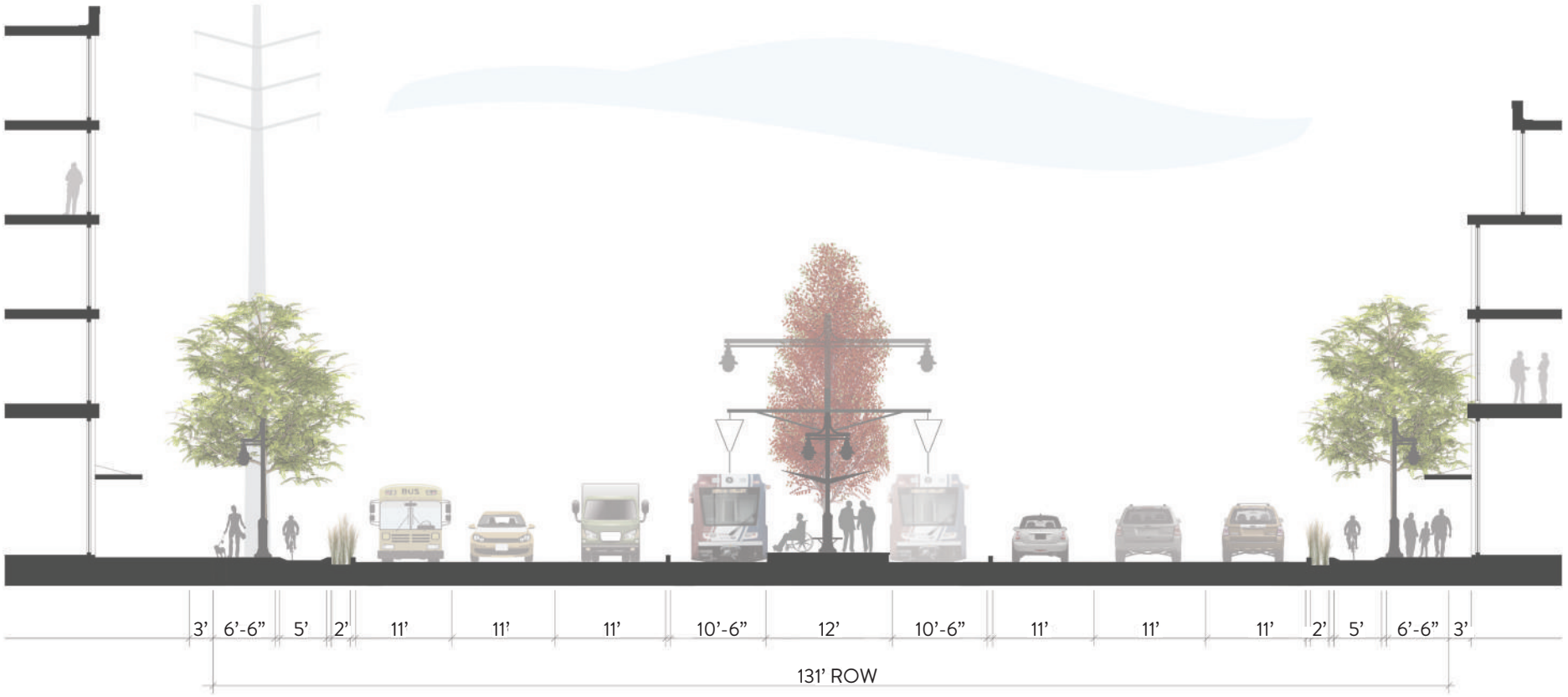
In a typical cross section of the development nodes along Fort Union with the LRT system, we have a minimum of 7' of sidewalk on each side with an expandable 3' setback for construction. In many situations, it will be necessary to expand the setback width to accommodate existing power lines. It has also been proposed that a cycle track be introduced along Fort Union. The cycle track would take 5' of right of way on each side of the road. It would be separated from sidewalks by grade, being at street level directly adjacent to the curb. Depending on ROW availability, anything from a 6" curb to a generous vegetated median would separate the cycle track from vehicular traffic. In some instances when a wider right of way exists, such as at 1300 East, the median separating the cycle track from cars also serves as an additional refuge for pedestrians, narrowing the distance they must travel to cross the street. Under the current proposal, right turn lanes are the only traffic lanes that will be cut out although lane widths would max out at 11'. Left turn lanes, while not being eliminated, will be affected. In some instances left turn lanes will be shared with the LRT lanes, which would require careful timing coordination at traffic lights. Currently, three lanes merge into two on the east side of 1300 East. By moving the merge point to the intersection itself, a larger median/pedestrian refuge is median/pedestrian refuge is established at the east side of the intersection and an additional left turn lane is created on the west side (westbound turning north). The eastbound south-turning traffic would be required to share the left turn lane with LRT tracks. The overall goal of the proposal is to make a more complete street by introducing LRT and a cycle track while minimizing ROW takings and maintaining current vehicular level of service.

IDEA The life on the street at or near stations helps to improve the quality of the transit corridor: Streetscape elements the provide opportunities for sitting, walking, waiting, people-watching, talking, dining and shopping create more vibrant and desirable pockets around the transit stations

LIGHT RAIL CONFIGURATION 1: SPLIT RAIL

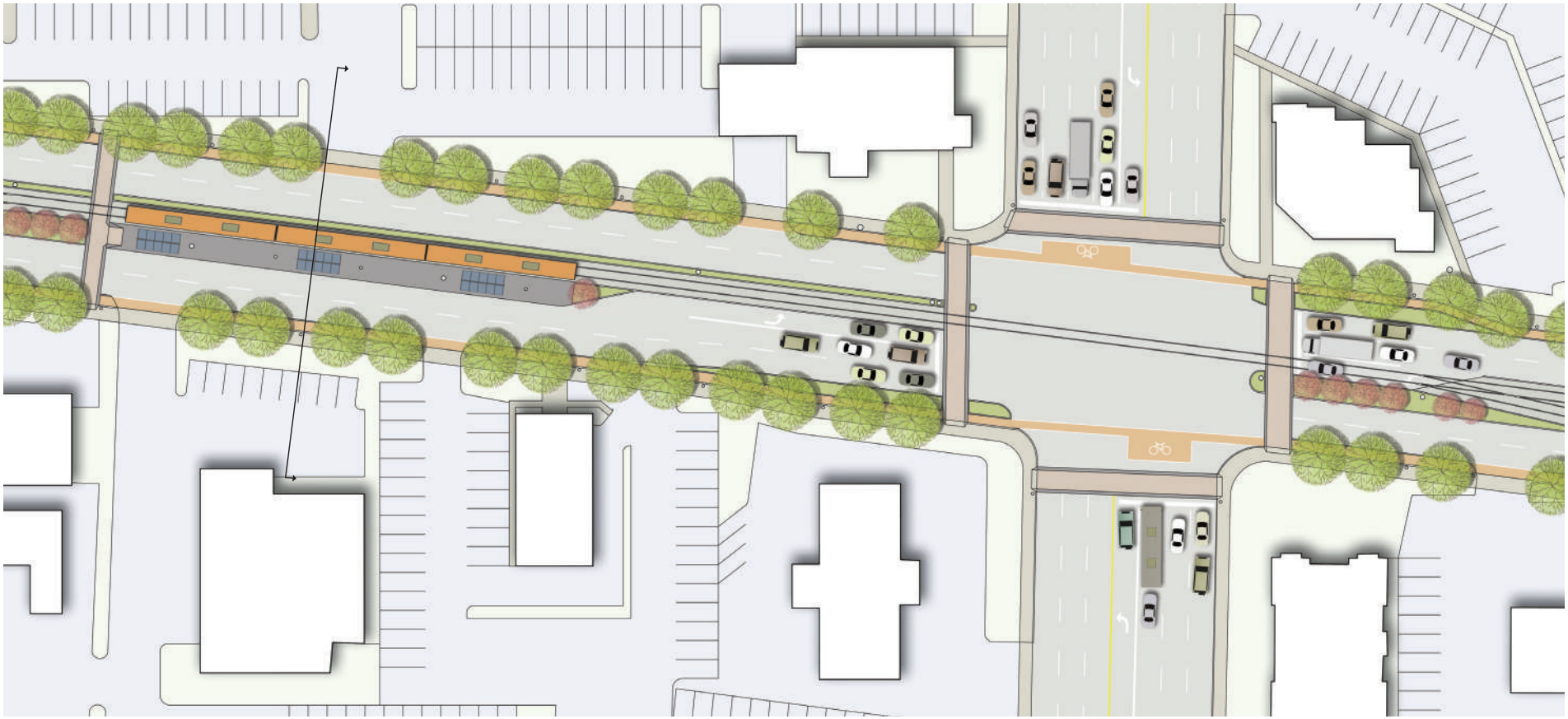


Plan view rendering of the light rail configuration at 1300 East: in this arrangement the road provides sufficient right-of-way widths for a double rail line for the LRT. Unlike a streetcar system, an LRT system generally operates in dedicated lanes. This can allow the LRT vehicles to move quickly, free from impeding traffic, however, this right-of-way dedication does require more space from the road

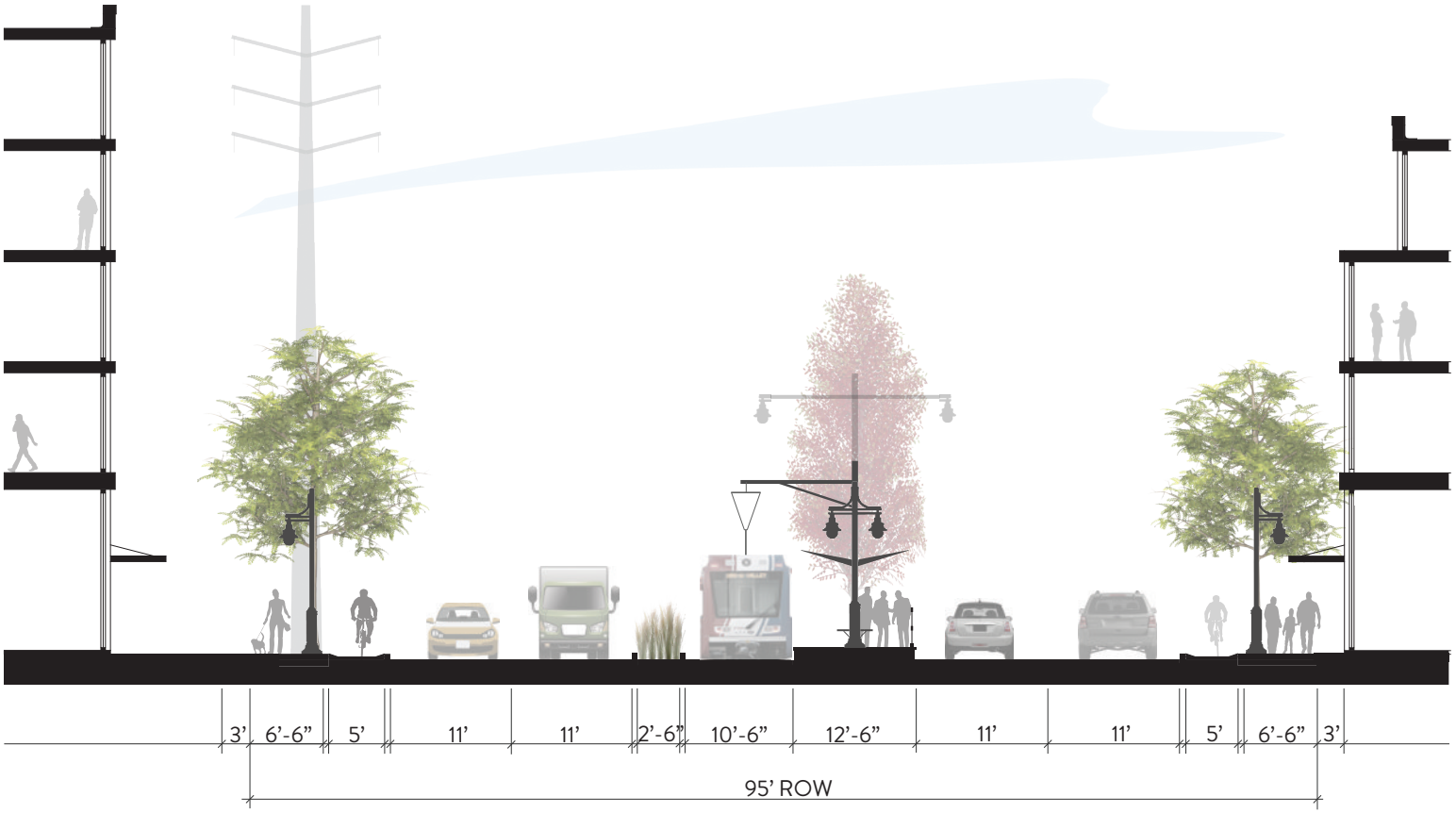


Section of the double rail configuration with a shared station: at the intersection this plan still allows for two lanes of traffic in either direction as well as left turn lanes. Examples of this configuration can be seen throughout many points along the TRAX line that runs through Salt Lake City

LIGHT RAIL CONFIGURATION 2: SHARED RAIL AT PINCH POINT



Plan view rendering of the 'pinch point' shared rail configuration at Highland Drive: in this design, due to the narrowing road, the rail briefly merges to one line. Through the timing of the lights, the east and west bound trains alternate between uses of the station and the rails as the line narrows through the intersection. When space increases, the lines split again to the double line



Section showing the ‘pinch point’ shared rail configuration at Highland Drive: by narrowing the LRT dedicated right-of-way, the road is able to maintain two lanes of traffic in each direction as well as sufficient sidewalk space and a cycle track

IDEA Stations should be well lighted to provide safety: This design consideration is not only important for the safety of the users but likewise helps to provide visual resonance of the stations along the corridor

IDEA Cycling is a very important connector for any transit system: Not all stops can be located exactly where every user can walk directly to their destination. By providing bicycles, such as those from a bike share program, users are able to continue on their journey quickly and easily, directly from the station

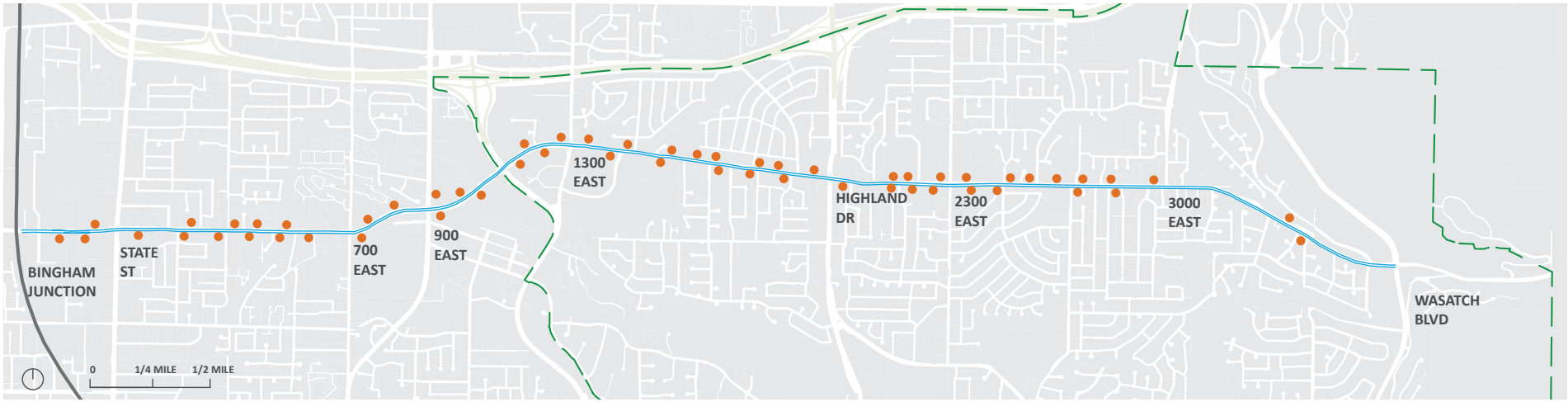
ROUTING PROPOSALS

DISTANCE AND FREQUENCY

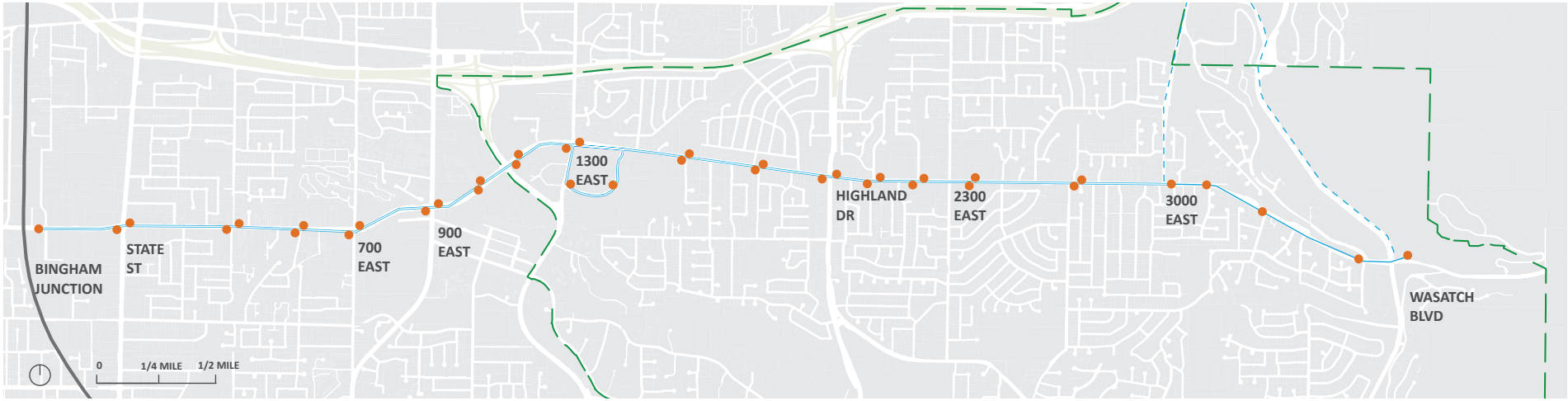
When it comes to transit routing, there is currently no clear answer as to the appropriate number of stops and the distance between them. However, there are general guidelines and principles which can help to select the best locations and space between the stops depending on the mode of transit. The general practice in some location is the United States is to place the stops about every 3 blocks or 1/4 mile. This may not always be appropriate as the proximity of stops determines the operating speed of the transit. Routing for modes like a standard bus or street car is to place a stop slightly within a walking radius that most people are willing or able to travel. This walk radius is not exact but for a local-stop service this is roughly ¼ mile or 1,300 feet. In other transit modes such as Bus Rapid Transit or Light Rail, which tend to be more regional type services, the distance is approximately 3/5 mile or 3,280 feet.

While these distances are a good starting point to calculating the number of stops needed, there is a crucial consideration that must be examined. A circle placed over a city plan assumes that within that area a pedestrian is walking unimpeded. This method fails to take into consideration the fact that streets and buildings alter these walking patterns and this can dramatically change how easily the stops can be accessed.

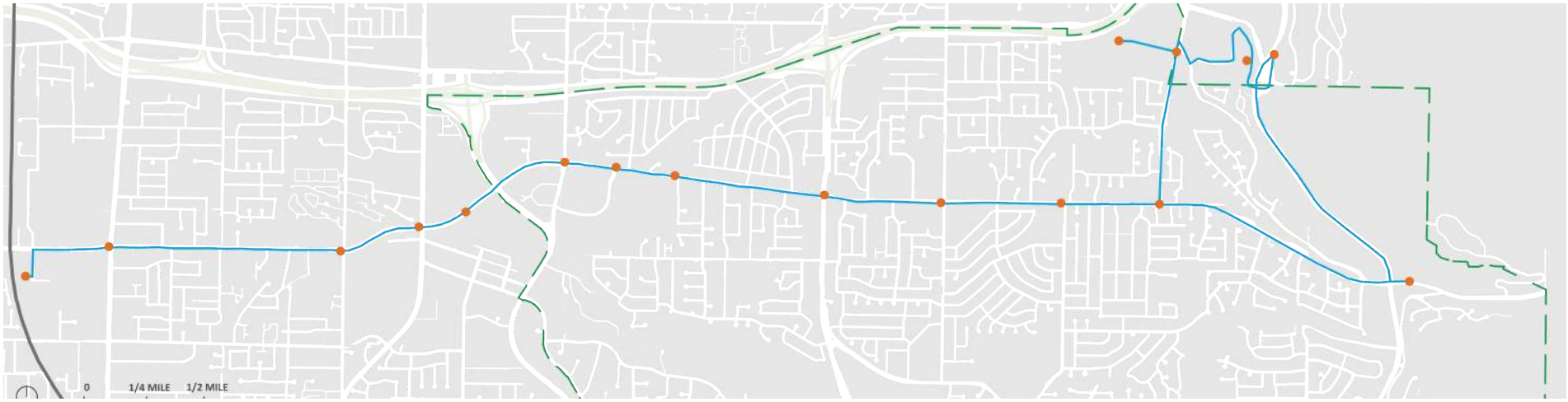
For the routing proposal on Fort Union Boulevard, each transit mode has been given these considerations to determine the appropriate locations for these stops. The bus and streetcar lines have been given the most frequent stops to act as local service providers. The BRT and LRT routes are spaced at much greater distances but are still located as to provide stops at crucial nodes marked for future re-development.



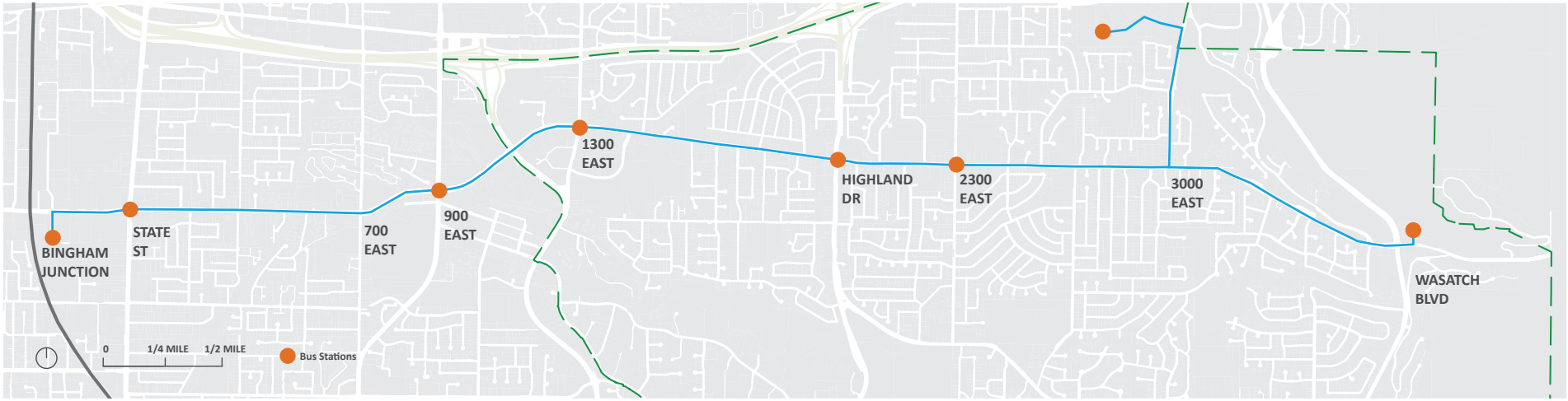
Routing diagram for the proposed bus stops on the streetscape improvement plan



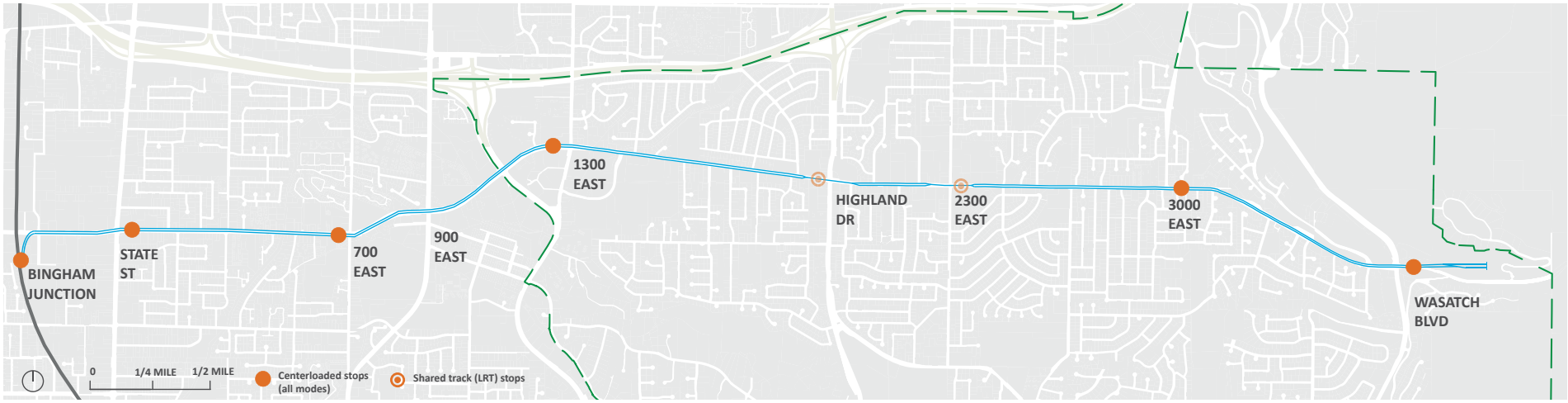
Routing diagram for the streetcar transit proposal



Routing diagram for the Bus Boulevard transit plan



Routing diagram for the center lane BRT transit plan



Routing diagram for the Light Rail transit alternative

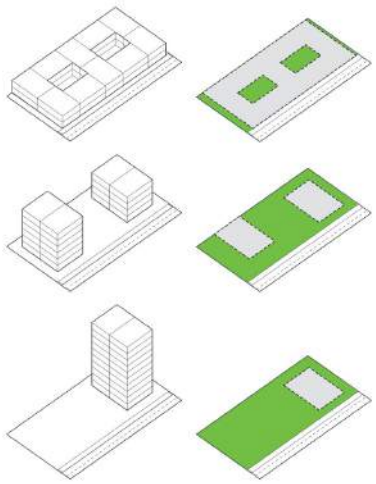
TRANSIT MODE DENSITIES + CONFIGURATION

DENSITIES

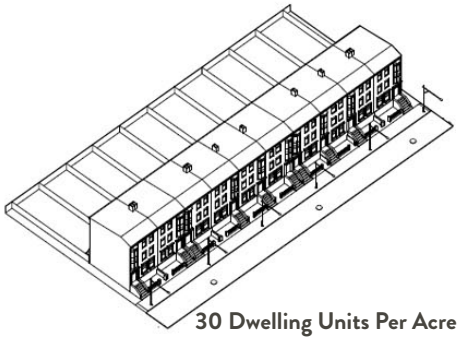
As a general statement, it is widely accepted that in order for public transit to be successful the urban development around the transit lines should be built to a higher density. Likewise, building for business is also essential. By clustering businesses into tighter areas of significant development, this creates the focal point for transit to operate more cost effectively. Though the exact figures for these developments are often debated, studies are beginning to point to the numbers represented in this outline.

Light Rail is cited as the mode that requires the highest density. The recommended density for light rail is approximately 30 housing units per acre and development for at least 50 jobs per acre. Streetcar and Commuter Rail require 20 housing units per acre and 25 jobs per acre for employment.

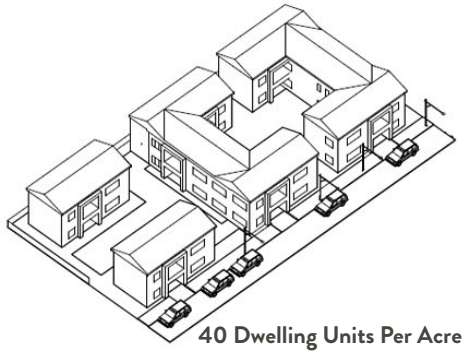
Bus Rapid Transit only requires 10 housing units per acre and 20 units per acre for employment. The last mode identified is a Frequent Bus system. This method would require the least amount of alterations to the city structure as it only requires 5 housing units per acre and 13 units per acre for employment.



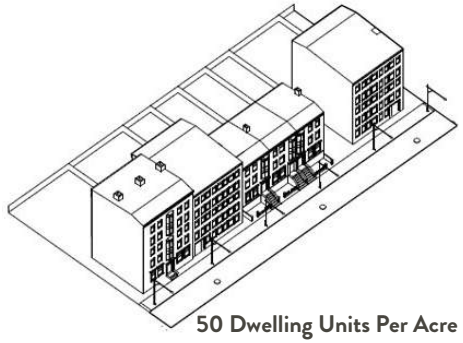
IDEA Examples of what the same density can look like in various building forms: these images represent 30 dwelling units on a one acre site



30 Dwelling Units Per Acre



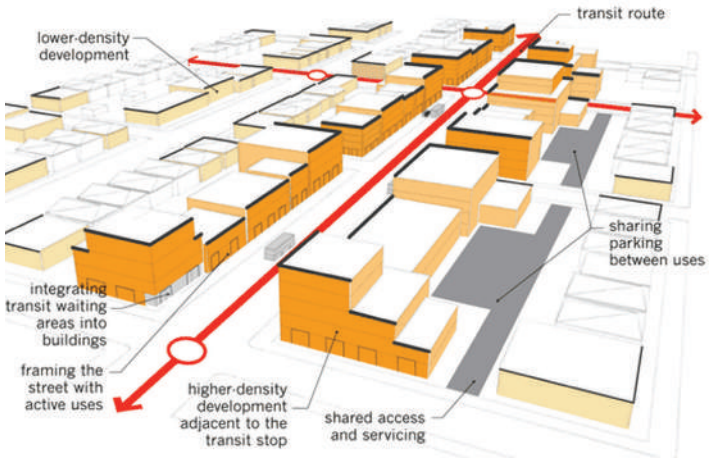
40 Dwelling Units Per Acre

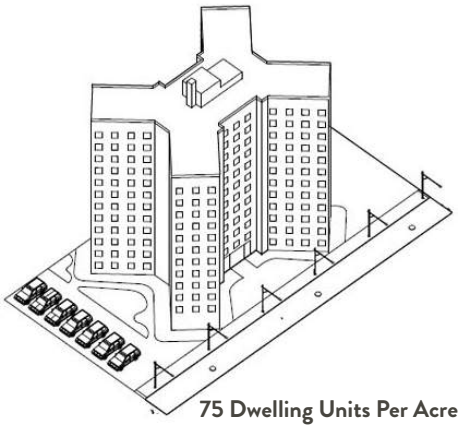


50 Dwelling Units Per Acre

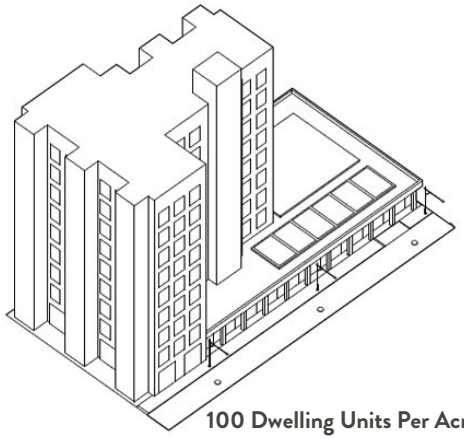
BUILDING LAYOUT AND ORIENTATION FOR TRANSIT

The most effective means of creating transit supporting development is to allow the street, transit, and transit stops to be the central element around which buildings are organized. Building orientation, if done properly, can facilitate a vibrant and inviting pedestrian environment. Likewise, architectural variety, landmarks, clearly delineated entrances, and windows at street level all contribute to a transit supporting development that is interesting and encourages pedestrian activity. Framing and enclosing the street can occur through massing and transitions in height and density. These processes of development allow the focus of activity to be around the transit stops and stations areas and create thriving and desirable places for people.

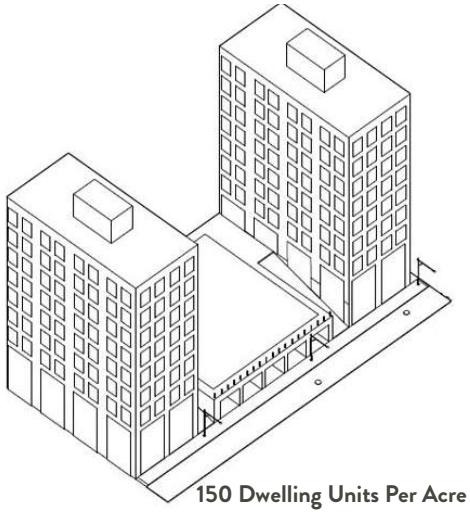




75 Dwelling Units Per Acre



100 Dwelling Units Per Acre



150 Dwelling Units Per Acre

IDEA Various densities take shape: these building types represent what different housing densities look like on a one acre site. Given the current size and density of Cottonwood Heights, the first three options would fit within the context of the existing city and would be acceptable. The last three densities, 75 units per acre and above, are not appropriate for a the city and the structures would be far too large

IDEA Photo simulation of different density development for a street: as part of a transportation study carried out by students from The University of Berkeley, images were created to generate input as to what various densities and transit types would look like on the streets of Stockton, California. The study found that the general public liked the idea of high-end transit options, but when presented with the densities required for these modes of transit, felt that it was not appropriate for their community. Their view of future growth and transit would be stifled by what they currently deemed an acceptable building height and density for their city. In order for cities like Stockton to be able to achieve larger transit goals, the public must be educated as to the necessary development around these transit lines and become aware that the density determines the success of the project

PROPOSAL FOR CATALYTIC PROJECTS

PROJECT TYPES DEFINED

Three catalytic development proposals are included in this study alongside the transit alternatives to demonstrate how increased densities can be situated alongside appropriately matched transit modes. These redevelopment proposals are of three distinct types, but are all considered transit-oriented development: a new town center, a civic center complex, and infill development along Fort Union Boulevard.

TRANSIT-ORIENTED DEVELOPMENT

Transit-oriented development (TOD) is an idea that came of age in the 1980s in response to efforts to curb land consuming sprawl. The idea has been advocated by numerous urban activists, academics and cities around the world to guide higher density development, new commercial and job centers, and public amenities to places around transit stops – so that development goals dovetail transit goals. TODs are generally located within a ¼ mile to ½ mile radius of a transit stop. In successful TODs, development is usually highest and most dense around the transit station, and steps down gradually as one moves further from the station until it melds seamlessly with the lower density urban fabric of the city. Successful TODs are barely noticeable to the conscious urbanist because they seem so natural and effortless. Transit-oriented development has been used successfully in many cities of Europe, South America, Australia, and Asia (without use of the moniker) for many decades. Copenhagen, Paris, Melbourne, Hong Kong, Curitiba, and Guatemala City.

Several North American cities have created TOD policies to shape urban development and metropolitan urban form. These places are interested in the synergistic effects that increased development intensity can pair with investments in mass transit. Some of these places are Montreal, Vancouver, Toronto, San Francisco, Oakland CA, Portland OR, Arlington VA, Washington DC, and notably Salt Lake City UT. Two books by Robert Cervero detail TOD success: Transit Villages in the 21st Century (with Michael Bernick) and The Transit Metropolis. Another noteworthy read on the subject that also looks at their design is by the University of Utah's Reid Ewing and Keith Bartholomew, Pedestrian and Transit-Oriented Design.

TOWN CENTERS

New outdoor shopping centers that are mixed with residential housing units and upscale amenities emerged on the commercial development scene in the late 1980s and trended upward since the 1990s. These are colloquially known as town centers and are differentiated from outdoor malls and lifefstyle centers by the addition of residential land uses that are integrated consciously to replicate the functionality of older downtown mixed use developments (which surprisingly don't happen naturally any longer due to increasingly atomistic and risk averse development practitioners). They are sometimes known as "boutique malls," but this is inherently unfair since they function on many more levels than the standard outdoor shopping mall. In the United Kingdown these are often known as urban villages.

FORT UNION BOULEVARD INFILL

IDEA Example of infill through phasing: in this rendering the process of filling in vacant spaces with buildings is shown. In addition existing buildings are given a face lift and new building setbacks are aligned with the sidewalk to improve the streetwall

EXISTING CONDITIONS

The intersection of Fort Union Boulevard and Highland Drive presents several redevelopment opportunities at various locations along the corridor. The redevelopment node was bundled into four categories which also represent many of the conditions along Fort Union as a whole. Approximately a quarter mile to the west of the intersection are two strip malls; one on the north side of Fort Union, and the other to the south. The northwest corner of the intersection contains a Whole Food's grocery store, two banks, and a handful of retail stores. The northeast corner is filled with a small retail building on the corner and a Dan's grocery and parking behind it.

The southern side of Fort Union is comprised of many small shops on small parcels of land. Each of these sub-sites presents its own redevelopment strategy. As such, they represent the typical conditions found throughout Fort Union Blvd. The rest of this section will explain the redevelopment of these sites as demonstrations for procedures for all other similar sites.

The sites have been named to help identify them. The west section that contains the strip malls will be referred to as Western Malls. The Whole Food's lot will be called Highland Place, for that is the name it currently has. The northeast corner will be referred to as Dan's Grocery. And the south parcels will be called Southside. Three design principles were used to demonstrate various types of infill. They are:

- Create a streetwall to envelop the space
- Increase the variety of uses to activate the space
- Re-configure the built environment to renew the space

Furthermore, while considering transit alternatives it is necessary to gain densities to support the transit. Therefore, most redevelopment sites have added residential units to help raise the overall units per acre in the area.

The retail strip malls in Western Malls are perfectly functional buildings, but they are set so far from the street that there is no streetwall. The redevelopment of this site shows how buildings can approach the street and how parking can be hidden in the back. This is a technique that has been used in other cities and found to be very popular. The north and south infill developments are similar yet unrelated since they are divided by Fort Union Blvd. The north side removes the existing buildings to make room for the new. It has retail with residential above and underground parking below at the street wall. Stack rowhouses are built along the northern neighborhood street. Parking for the retail stores is found between the two developments.

The south side of the street keeps the existing strip mall as an example of adaptive re-use. It also adds retail at ground level and residential above, completing the streetwall at this location. Once again, parking is found between the buildings. Highland Place has the most development since it has the largest available acreage. Redevelopment here embraced the attitude and lifestyle of the everyday shopping needs given by

the existing stores. It also demonstrates how to make a space more attractive and active to people. One of the first requirements for this site is to move inactive uses away from the corner lot. This means that the bank will have to be relocated in order to make room for more active uses such as restaurants or cafes. A large pedestrian plaza has been added to make the shopping experience more enjoyable. People would rather walk through shaded, interesting walkways than through an enormous parking lot. Thus the parking in this site was compacted into a parking structure, or brought closer to the stores' entrances. Retail was used to activate the space while residential apartment flats are built above. The public realm of the plaza acts as a pathway for pedestrians and a place to spend time.

Dan's Market illustrates the need to reconfigure the current built environment so that a space may get renewed energy. Small scale retail can be placed along both Fort Union Blvd as well as Highland Drive to create the streetwall. The new Dan's has to be re-oriented to the buildings around it. It will have a parking deck to the side and two residential units above. The residents will be able to use the rest of Dan's roof as private open space.

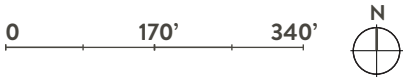
The south side infill was mainly to re-establish the streetwall in places. This was done by adding onto the existing buildings rather than replacing any of them. This would increase the overall retail and office space, but it would not add any residential units.

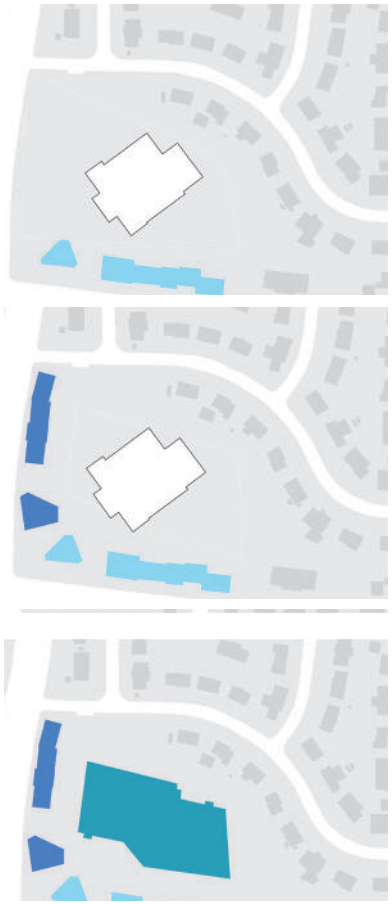
An image showing before improvements are made on Fort Union Blvd: power lines dominate the look of the road. Large setbacks leave the space feeling vast and empty

A rendering showing the look of the street after the improvements are made: A streetcar now provides alternative transit on the street. Street trees add color and improve the look of the road. Buildings are built closer to the street improving the streetwall and creating a better sense of enclosure

Plan view rendering of the existing conditions currently found near the intersection of Highland Drive and Fort Union Blvd: much of the space is dominated by parking lots surrounding the buildings. These large setbacks make the street feel larger than it actually is and less hospitable to pedestrians. The street begins to narrows considerably compared to 1300 East and will continue to get smaller as it continues to travel east

Plan view rendering of the infill and redevelopment proposal: the plan takes underused and excessive parking space and places new buildings and plazas in their place. The new design increases the public realm and creates attractive places for people to gather and actually enjoy the space. New housing and retail options are provided and the density is increased to help support the proposed transit options. This design offers a model for future small infill projects that can be easily planned and developed throughout the Fort Union Blvd corridor





Phasing plan for Dan's Supermarket : the plan begins with infill of the parking lot and then is finalized with complete redevelopment of the supermarket building

PHASING

There are three proposed redevelopment sites along highland drive: Dan's Supermarket, Wholefoods, and Cottonwood Mall. Each of these sites have different phasing strategies some longer than others.

DAN'S SUPERMARKET
PHASE 1

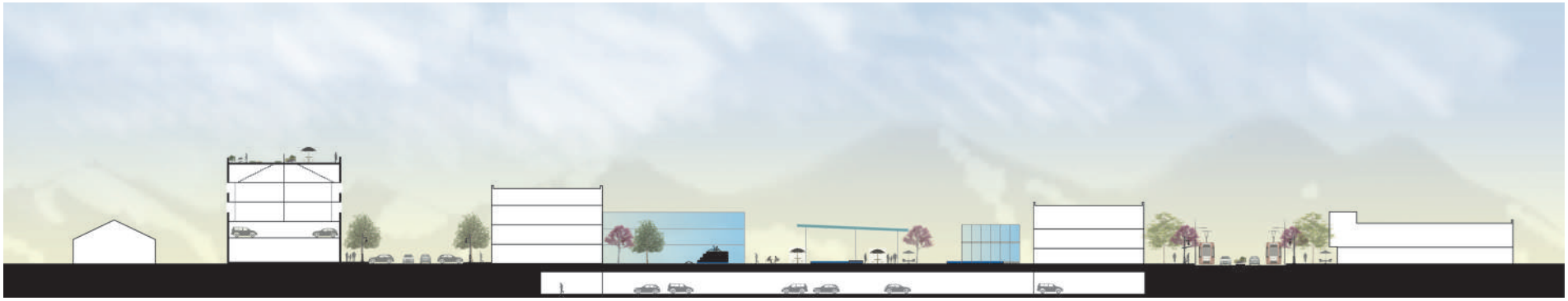
Dan's Supermarket is just east of Highland drive. It is located on the Northeast corner of the Highland Dr and Fort Union intersection. Phase 1 consists of building retail along the southern part of the selected site. This phase will not be built with any other phase. It will be the first of three phases of the redevelopment of Dan's. It will reduce the number of parking spaces, but not significantly enough to make it a problem. There will be two separate structures along the south side of the site. The first, and the bigger of the two, will run parallel with Fort Union creating and continuing the street wall along the street, that has become our adopted policy in this studio. The other corner structure will be facing the southwest corner and acts as a part of the open corner effect we are trying to produce at this site. Later in Phase 2 another similar building will mirror this corner building.

PHASE 2

As in phase 1 this phase will see the construction of retail units along the western side of the site. Also as in phase 1 this part of the project will not be built simultaneously with any other construction. This addition to the site will see another reduction of parking making the Dan's parking lot somewhat of a competitive place to park. It should be noted that currently the parking lot at Dan's is extremely under capacity and the consensus is that the space can handle the reduction in parking seen by adding the retail. The total amount of parking spaces lost are 67, however, the design calls for an addition of 110 dedicated parking stalls in phase 3. The structures of phase 2 are somewhat symmetrical to the ones in phase 1. They create a street wall along Highland Dr and complement the development across the street in the Whole Foods site. The corner building will complete the open corner talked about in phase 1. The space between the two buildings will become a natural public pedestrian realm.

PHASE 3

Phase 3 will be the last and final phase for this site. It is also the most intensive of the three phases. This phase will see the reconstruction of Dan's Foods. The store will also be re-oriented to better fit the layout of the site with the new buildings that were built in phases 1 and 2. There will be parking above the grocery store with residential units above that. This mixed-use development will add density and diversity to the site making it a better, more desirable, and attractive location.



Section of the infill and redevelopment of the Whole Food's parking lot: the new design places parking underground to allow for new buildings and a new plaza space for dining and gathering. The location of section cut lines can be viewed on the illustrative plan of the design proposal

Section of the infill and redevelopment of the Cottonwood Mall area: mixed-use retail and residential units will be built near the street in front of the strip mall. In time the mall will be removed for additional mixed-use buildings

Phasing plan for the Whole Foods parking lot: a new five story building is added first to the north side of Whole Foods. Later, residential units will be used to fill in the parking lot and create a new space for the public realm

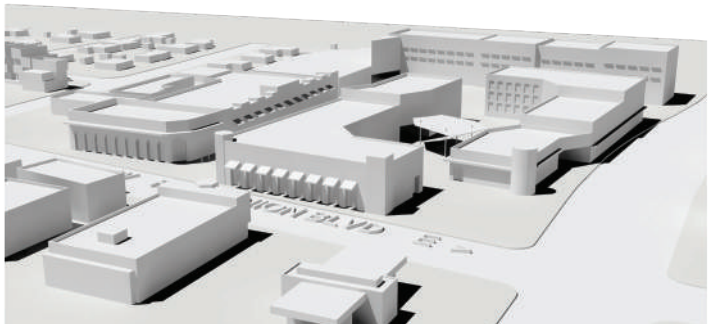
Whole foods is located on the North West corner of the Highland Dr and Fort Union intersection. It is one of the most complex of the projects proposed. It is not only on a busy intersection but also the project calls for considerable demolition of existing underutilized buildings.

WHOLE FOODS
PHASE 1

Phase 1 includes the construction of the tallest building in the site. In the most southern part of the site where an L shaped strip mall is currently found, the design calls for a future 5 story building. This building will consist of 3 residential stories of flats above a parking structure which is in turn above retail located on the ground level. The building will be oriented west to east while being connected on its west to a parking deck for Whole Foods' customers. The rational for this phase of the project is first to 1) bring residents into that underutilized space and 2) to be able to create a space where Whole Foods' customers will park both permanently and while phase 2 is being built. Also in phase 1 an extension of Whole Foods southward will take place to compliment the street wall that is being developed along Fort Union.

PHASE 2

This phase is the more intensive of the two phases. It calls for the construction of double loaded corridors with 1,400 square feet units for residential use. These residential units will be built above retail units that are on the ground level. These two buildings will be mirroring each other creating a space between them that is a pedestrian square with a water feature flowing into an amphitheater and a glass awning which provides shelter from the elements. Natural grassy areas and movable furniture will create a warm sense of place where visitors, residents, and the general public would want to rendezvous. This plaza will be permeable for pedestrians and also provide site lines to Whole Foods and to the various businesses that will occupy the surrounding buildings. The patrons from the numerous restaurants and cafes, that will move in once construction is complete, will be able to utilize the space. Phase 2 will also make way for a main street-like environment that will run through the site. This street will be located between the farthest north building built in phase 1, and the buildings being built in phase 2. This "main street" will be 22 feet wide with traffic in both directions moving at low speeds. It will connect Highland Drive to Fort Union in a "loop" pattern.



Massing model for the proposed Whole Foods redevelopment: new buildings fill in the existing parking lot and provide additional retail opportunities

Massing model for the Cottonwood Mall redevelopment: the image shows how the new mixed-use buildings add density and help define the street

Massing model for the Dan's Supermarket infill and development: the street is lined with smaller buildings and the site of the former supermarket is redeveloped to ad height and improve visibility from the street

The Cottonwood Mall is located west of the Whole Foods and Dan's. Unlike the other two projects this project extends across Fort Unions north side to its south side.

COTTONWOOD MALL
PHASE 1

The first phase of the Cottonwood Mall project will see the construction of retail units with residential above them along Fort Union on both the north and south sides of the street. Again, there will be an emphasis on the street wall that needs to be established. The existing strip malls will remain operational during this phase so that the land owner can still collect rent from them.

PHASE 2

Phase 2 of this project will see the construction of town houses along the northernmost part of the site. This phase will have the existing strip mall demolished and then have the town homes built with retail on the bottom level. The same retail tenants could potentially move back in after the re-construction. The space between the two buildings will be parking for retail and residential. These lots will also be separated into two respective phases as the buildings are constructed.

Phasing for the Cottonwood Mall: initially small mixed-use retail and residential units will fill in the spaces in front of the existing buildings, bringing structures closer to the street. In the second phase the strip malls are replaced with additional retail and residential units

FORT UNION BOULEVARD LIFESTYLE CENTER

IDEA Mixed-use developments: while the term mixed-use can be broadly defined, for the purposes of this project the term includes a mixed of residential, retail, commercial and cultural uses

EXISTING CONDITIONS

The site located at 1300 East and Fort Union Boulevard currently consists of strip mall and large box store development. A small road called Park Center Drive travels through the site, bisecting it. On the land extending north of Park Center Drive up to Fort Union there is a long strip mall with a large parking lot, a hotel, a larger light manufacturing building and two small manufacturing buildings, two smaller strip malls, three stand-alone food establishments and a gas station. The parcels extending south of Park Center Drive consist of a Target retail store, Home Depot, a vacant Circuit City, Barns and Nobel, Old Navy as well as two smaller strip malls.

The large box stores have extensive amounts parking in front resulting in a potential site for small infill projects. The site is for the most part owned by one land owner. This is extremely helpful in moving forward in the redevelopment process. As the site exists currently it is predominately retail. If infill and redevelopment were to occur, a mix of uses could be introduced including additional retail and restaurants as well as housing, office and entertainment.

PROPOSAL

The proposal for the site consists of creating a long, pedestrian corridor that extends from the corner of 1300 East and Fort Union Boulevard all the way to the southeast corner of the site which will be an entertainment area consisting of a movie theater, brew pub restaurant as well as a Dave and Busters which is an adult arcade and entertainment center. The vacant Circuit City will be retrofitted for the Dave and Busters while the space currently between the vacant building and Target will be built into the movie theater and brew pub. To accommodate the need for additional parking a parking structure will be built behind the movie theater.

The slope of the hill that currently separates the site from the surrounding neighborhood will serve as a visual buffer and the residents should be unaffected by the addition of these buildings. Smaller restaurants and shops will begin to fill in the parking lots of Target and Home Depot, improving the visual quality of site and create a more pedestrian friendly scale. The pedestrian corridor will progress north. A small market will be created near the existing manufacturing building, which will be retrofitted into commercial space. This market will transition over to a path designed to mimic a dry river bed that dips and traverses through the space, providing people-watching spaces, water features, tree alleys and colorful plantings. This space is surrounded by mixed-use buildings to create a place for people to live, work and play in one location. Located near the corner of 1300 East will be a restaurant, hotel and conference center. This location is ideal for patrons to have have access to alternative transit, allowing them to access recreation to the airport without having to rent a car. Additional apartments will also be included on the site, improving the overall density of the area as well as providing alternative housing options for those wishing to live in Cottonwood Heights.

Rendering of the parking lot infill at Target and the former Circuit City: the pedestrian promenade is extended all the way through the new development and terminates at the new brew pub and IMAX theater. Part of the parking lot is now filled with the pedestrian plaza, restaurants, and small shops. Colorful glass panels of dye-synthesised solar cells provide a shade structure during the day and light up at night to create a vibrant evening atmosphere

IDEA There is an overabundance of parking spaces in the U.S.: it is estimated that given our standards set out by parking guidelines, the U.S. now has 3 to 8 parking spaces for each car

$310 billion: amount spent to subsidize free parking

$65.5 billion: the federal education spending

$18.5 billion: the budget for NASA

IDEA The cost of free parking: the current design standard of placing a sea of parking stalls in front of box stores and strip malls is extremely expensive. Researchers have found that the cost of providing free parking in 2011 in the U.S. ran around around $310 billion. This number represents a little less than half of the National Defense budget. These findings put into question the value of "free" parking and if we are giving far too much in order to maintain this practice

TRANSIT SUPPORT

This redevelopment provides much needed density to support transit uses. With 358 two bedroom units across the 73 acre site, we expect an overall housing density of 4.9 units/acre. This number is a little low for streetcar transit, but is much higher than the zero housing units per acre that exist currently. These residential units help support nearby businesses, and make this area more lively and active. Retail density is also much greater after the redevelopment, with the square footage effectively doubling to 1,137,000. Before the redevelopment, the primary use of this area is strip commercial and big box stores, which depend on large volumes of vehicular traffic to survive. This project greatly increases retail and housing densities in a way that encourages walking and exemplifies a lifestyle where one can live, play, and work all in the same place without necessarily having to drive from place to place. This can be catalytic for transit because it creates a destination where transit riders would want to go, as well as provide housing that can easily access transit.

PARKING

There are currently 2,304 surface parking spaces in the development site. 905 spaces are provided in the area in front of Barnes & Noble, Home Depot, and the Circuit City site; 529 spaces are in front of Target; 314 spaces are in the strip mall near Office Depot; and 556 are located near the strip mall on the corner of 1300 East and Fort Union. The proposed development generates demand for 5,194 parking spaces. This number was calculated from parking requirements dictated in the off street parking requirements for Salt Lake County (http://planning.utah.gov/Index_files/PDFs/slcounty19.80.pdf). Our proposed parking plan includes 5,071 parking spaces (1,156 surface spaces and 3,915 garage spaces). For the surface spaces, there would be 584 spots near Home Depot, 424 around Target, and 148 spaces near Office Depot. There would be 5 garages: a two level above-ground garage in front of Home Depot, a 4 level above-ground structure behind the movie theatre, a 1 level underground structure under the apartments at the corner of 1300 East and Park Centre Drive, a 4 level underground structure under the southernmost mixed-use retail/residential buildings, and a 2 level underground structure under the northernmost mixed-use retail/residential building.

PUBLIC REALM

The infill and redevelopment of this site creates many opportunities to improve the public realm. Park Center Drive becomes a street shared by vehicle, street car, cyclist and pedestrian. A strong emphasis is placed in creating multiple pedestrian connections both through and across the site. Large sidewalks with café dining, street trees, and pedestrian lighting are some of the elements used to create this space. A long pedestrian corridor connected the site from end to end, changing and progressing as it moves through the various types of development. The parking lot between Target and Home Depot is softened by a large plaza that hosts restaurants and café dining as well as space for informal

outdoor eating with small food vendors. Water features, trees and planting improve the visual quality of the space and greatly enhance the overall appearance of the parking area. The pedestrian corridor that moves through the mixed-use development creates a large promenade that allows for dining, people watching, entertainment and water features. Paving materials will extend from the corridors across Park Center Drive as a means of emphasizing the pedestrian space.

PROGRAM ELEMENTS

Existing:

- Retail/Restaurants – 629,000 square feet
- Office – 26,000 square feet
- Hotel – 18,000 square feet

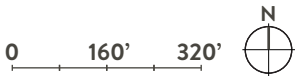
Redevelopment

- Retail/Restaurant/Entertainment – 1,137,000 square feet
- Residential – 318,000 square feet
- Hotels + Conference Center – 108,000 square feet

A day and night shot of the new plaza, movie theater, restaurants, and retrofitted Circuit City: the site brings life to what once was a parking lot. A parking garage behind the theater provides spaces for the stalls removed for the public realm. The diurnal nature of the different buildings surrounding the site allow it to act as a vibrant, active, and busy space during both the day and evening

Plan of existing conditions at 1300 East and Fort Union Blvd: the site consists of big box stores, strip malls, a few anomalous buildings and some vacant structures. As a whole the site is defined by large expanses of parking lots with much of the space being underutilized. The corner of the street is a high visibility area and in essence serves as a gateway to the city. However, currently this site and street corner are under-performing and provides no visible distinction between Cottonwood Heights and any surrounding areas

An illustrative plan of the proposal for the new town center: in this design the new pedestrian promenade will run from the intersection at 1300 E and Fort Union all the way down to the Target shopping center. The size of the site allows for the creation of a lifestyle center type development that will move down in scale with small infill buildings that help define the sense of space on the streets and between the buildings. Target will be given a new facade, Circuit City will be retrofitted and a new movie theater and restaurants fill in the 'big box' section of the site. The site of the former strip mall will be completely transformed into a mixed-use development that will create a unique space in the city to live, work, shop, eat and play. A new conference center and hotel will bring in out of town guests. The streetcar route provides stops on a loop through the site, making the area easily accessible



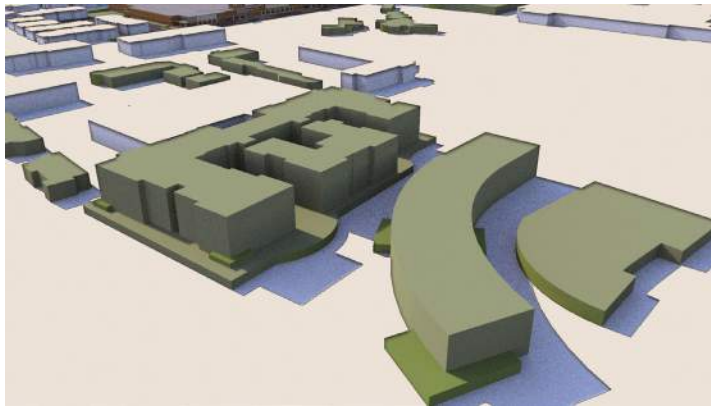
PHASE 1

The first phase of redevelopment in the town center site will be infilling the Target and Home Depot parking lot. This infill phase can be quickly and easily accomplished. The addition of one level retail and restaurant space will increase the worth of the current parking lot. Because this site only has one property owner, the phase can be completed with very little interference. Phase one also includes the addition of a parking garage in the northeast corner of the site. This garage will replace the parking that the infill buildings take from the existing parking lots. The parking garage is set against an existing slope so it will not impact the views of surrounding neighborhoods. It will also accommodate the proposed movie theater, brew pub and Dave & Buster's entertainment center going into the north east parking lot. Parking should not be an issue since the Target and Home Depot lots are usually used during the day, while the entertainment corner is more of a nightly use. The addition of different retail options will not compete with the Target, and will keep the area lively for more than half a day. This phasing project can be the catalyst to show the opportunity of the 73 acre site.

Phasing plan for the town center development: The three phase plan begins by improving the big box buildings and parking lot. After that is completed the lifestyle center development begins with new mixed-use buildings and infill within the existing retail. Finally the completion of the lifestyle center connecting from Target to the 1300 E intersection

PHASE 2

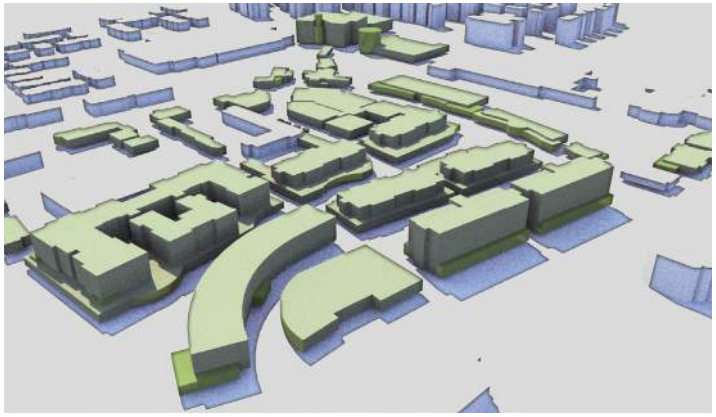
The second phase of the town center is the addition of a hotel, conference center and the first of the mixed-use retail/residential buildings. The new hotel will be located at the southwest corner of the site with a connected conference area that serves the city of Cottonwood Heights. There will also be infill surrounding the parking lot that resides along Fort Union Boulevard. These buildings will be one level retail or restaurants that provide a street wall along the road. They are the beginning of the formation of a Main Street feel.



Phase 2 massing model: looking from the corner of 1300 E and the Blvd

PHASE 3

The last part of the redevelopment phasing is the final additions of retail with four floors of residential on top. This will complete the mixed-use development on the northwest corner of the site, as well as continued infill along the road. There will be an additional parking deck in front of the Home Depot to accommodate the new structures. The last phase of the redevelopment project ties together the infill parking lot surrounding Target and Home Depot to the mixed-use development through a pedestrian walkway. The walkway allows for pedestrians to move through the space to shop, dine or enjoy sitting outside with their families. The meandering walkway represents the cohesion of both spaces as one. Residents can enjoy the surrounding area as much as the rest of the city of Cottonwood Heights or visitors staying at the hotel.



Phase 3 massing model: the completed project

IDEA A materials palette for the redevelopment: part of the process of providing Cottonwood Heights with a discernible identity are the materials used for the design. The materials should reflect the colors, textures and ideals of the city. In this selection the intent was to reflect the influence of the vegetation from the nearby canyon while at the same time bringing a modern, urban look through the architectural materials

FORT UNION BOULEVARD CIVIC CENTER

IDEA Redevelopment is an opportunity to reintroduce nature back into the urban environment: designs such as this example show how green elements can be incorporated into the design that provide shade for users and likewise habitat for birds and other wildlife

IDEA Unique design elements such as these street lights add interest and identity to the site: by creating streetscape furnishings that are unique and functional the result is a readily identifiable street corridor

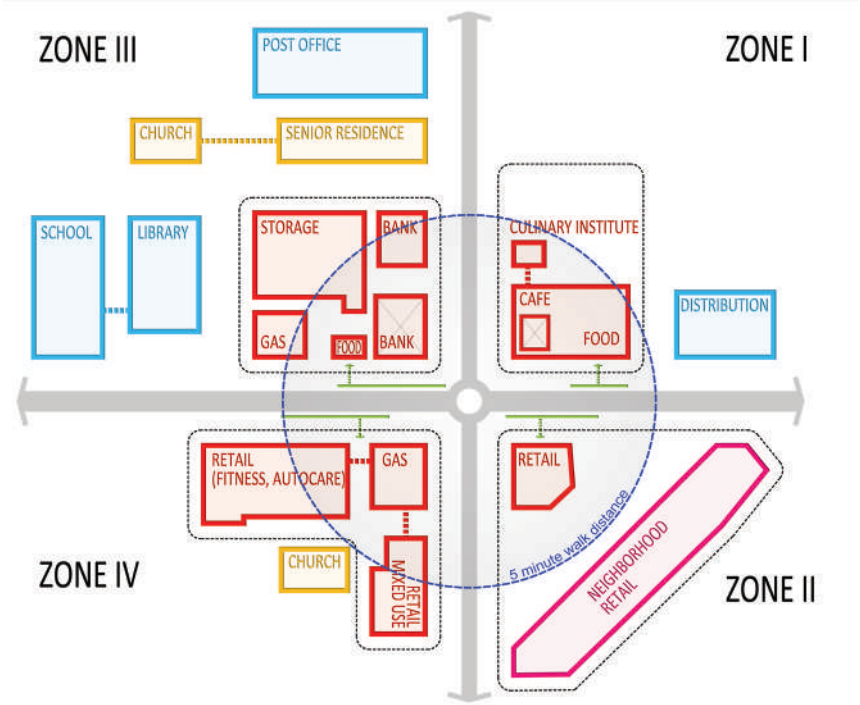
EXISTING CONDITIONS

The proposed civic center site is located on the northeast quadrant of the intersection at 2300 East and Fort Union. The intended parcel for the actual civic facilities is about 400' deep and runs along 2300 for about 300' with a finger extending from the back part of the lot south to Fort Union Boulevard. Five small, one level buildings exist around the corner between the lot and the intersection, none of which are of high value in a more dense, transit oriented development scenario. Further east along Fort Union is a large power facility, it has been viewed as untouchable for redevelopment. The site slopes enough from the southeast to the northwest that designs will have to account for it.

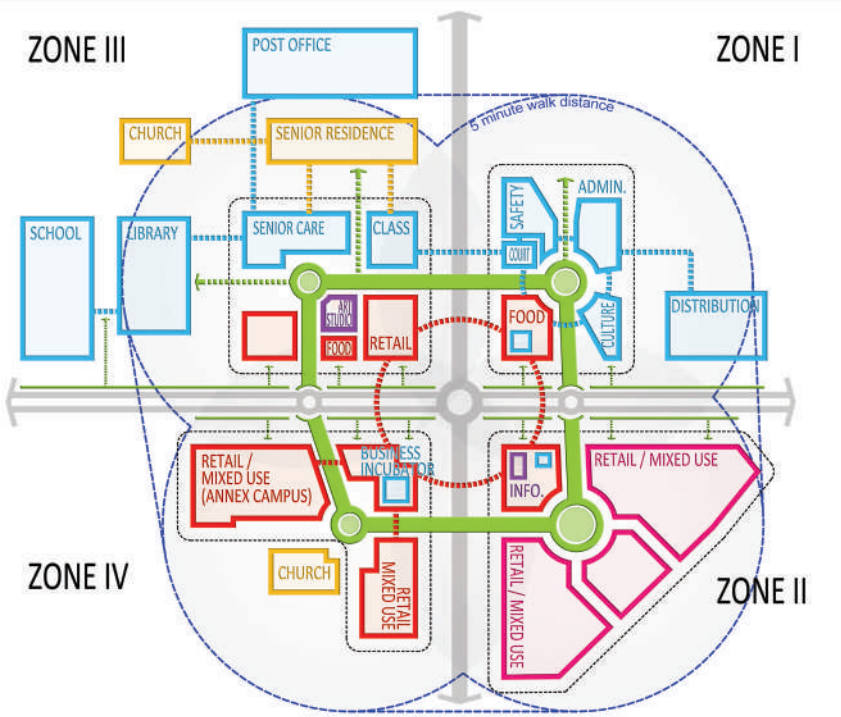
A dated single level strip mall with a vast sea of parking, and a Walgreens make up the southeast quadrant of the site. The Walgreens is on the corner, set back far enough for a retaining wall and a row of parking. The grade change on this portion of the site has been handled with a retaining wall running right next to the sidewalk. While it has been attractively vegetated, it does not foster a comfortable pedestrian experience and the retaining wall certainly does not capture the design opportunities that working with a mild slope such as this one presents.

The southwest quadrant of the project area has two 2-story office buildings in decent condition, a couple dated single-level commercial buildings, and a gas station on the corner. Along Fort Union lie an auto repair shop, two fairly new single-level retail buildings resembling a mini strip mall, and a carwash facility that is in good condition. Behind all of these buildings, in the middle of the block, is an LDS churchhouse. The grade is still in play on this portion of the site as well.

Lone Star Taqueria is the highlight of the northwest quadrant of the intersection. An elementary school, the library, and a post office are existing civic functions that are located further from the intersection in this quadrant. They are important pieces of a civic core and should remain, perhaps with their connection to the remainder of the site enhanced. The senior living facilities along 2300 E also contribute to the long term vision for the area and will be retained. A very large parcel in the middle of the block is currently dedicated to storage sheds. They benefit adjacent lots and the community very little and thus are not desirable pieces in the future vision. A bank, a credit union, and a car repair facility are all located in buildings that will be seen as underacheiving in a TOD scheme. They will be replaced as appropriate in the phasing of the development.

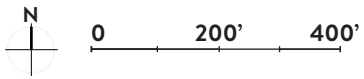


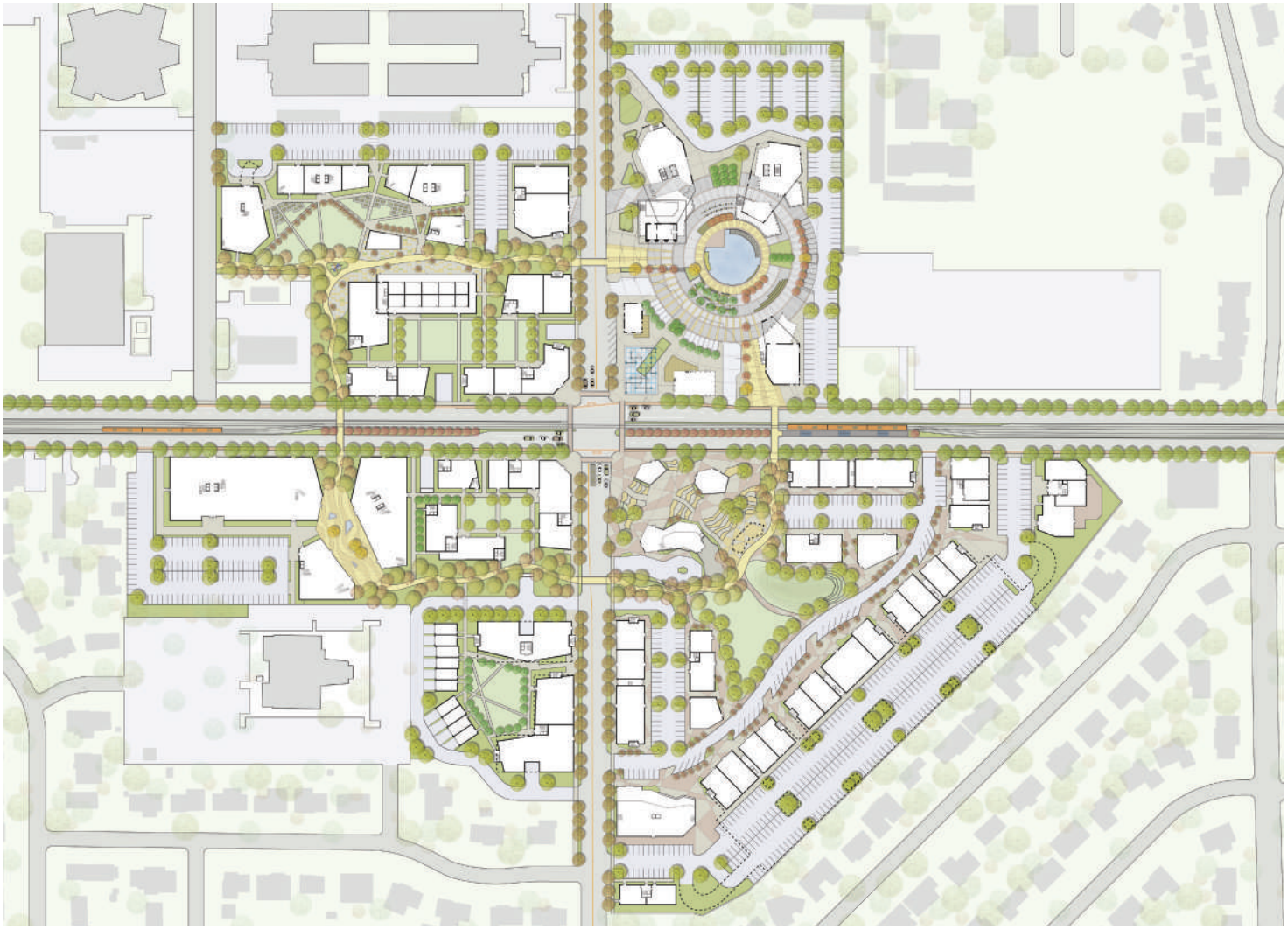
A functional use diagram of the existing conditions: buildings currently serve only single uses with little to no connection between them. Spaces are fragmented and hostile to pedestrian movement



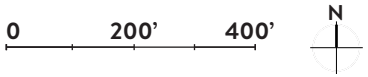
Functional use diagram after the redevelopment of the site: previous empty spaces now serve as places to gather and pedestrian paths that connect the site. The building configuration works to enforce the public realm and improve the quality of Fort Union Blvd

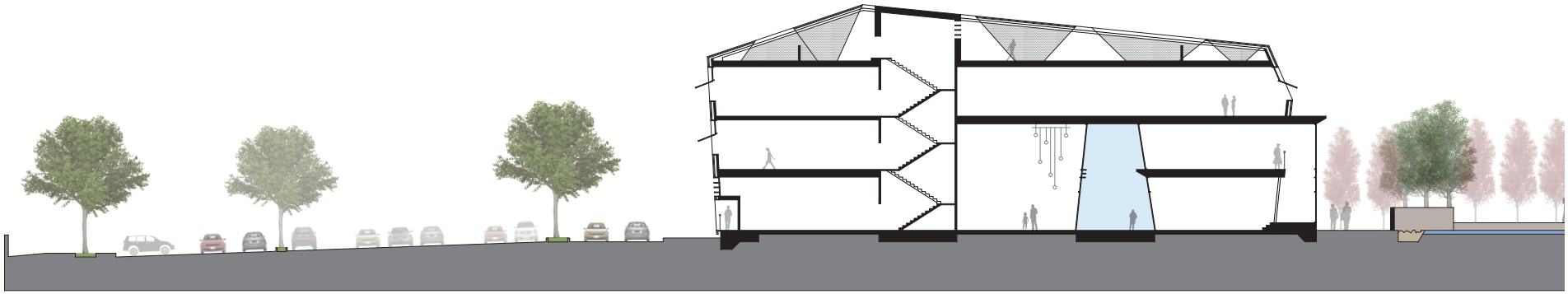
Site plan of the existing conditions at 2300 E and Fort Union Blvd: currently a large shopping center surrounded by underused parking dominates the landscape. Storage sheds, vacant parcels and stand alone retail stores dot the rest of the land surrounding the intersection



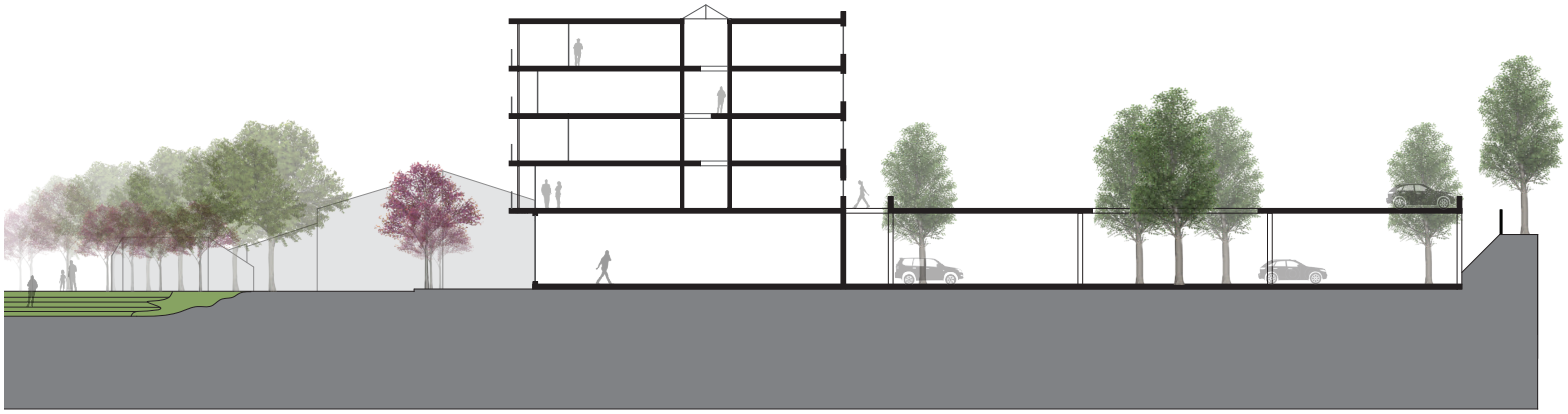


Illustrative site plan of the proposed civic center redevelopment: the plan provides the area with a connected and cohesive design. The development of the civic center creates an opportunity to create a strong, pedestrian focused development that connects a variety of spaces and buildings with attractive greenspace and pedestrian paths





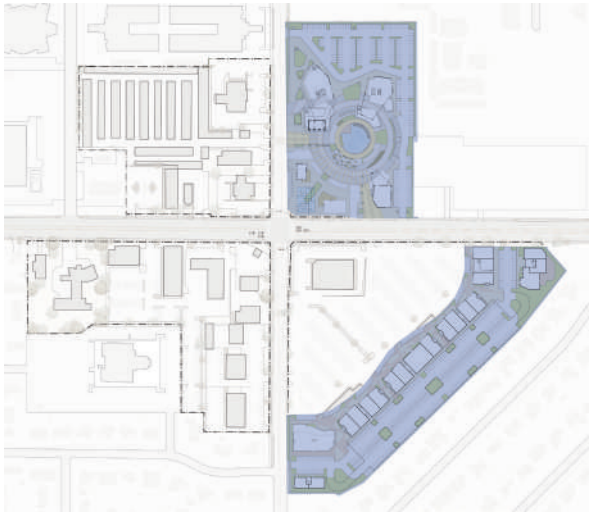
The new civic center transect: a section taken through the development shows the new and modern civic building and plaza space. The relationship to the street shows how users and employees of the street transit can easily access the site



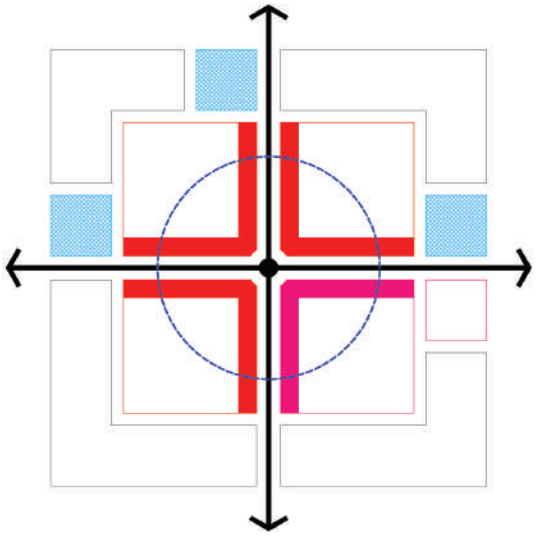
Transect of the site running north to south from the street through what once was a parking lot: the site now features a new eye-catching community center that hosts spaces for classrooms and learning kitchens. The previous strip mall is transformed into a mixed-use retail and residential site that has full access to all the amenities the 2300 E node now has to offer

COMMERCIAL CATALYST: ESTABLISHMENT

Northeast Zone I, 12.2 Acres: the groundwork for the project takes shape by building the civic center and its supporting buildings. The strip mall is also removed to make way for a new mixed-use development. These changes to the area provide the catalyst for the future changes to the site that will be supported by these new developments



The square diagram represents the establishment of the community catalysis for the site: with this phase of building, the area will now feature such amenities as city offices, public safety, food service, cultural center + museum, neighborhood retail and multi-family housing



NORTHEAST ZONE I

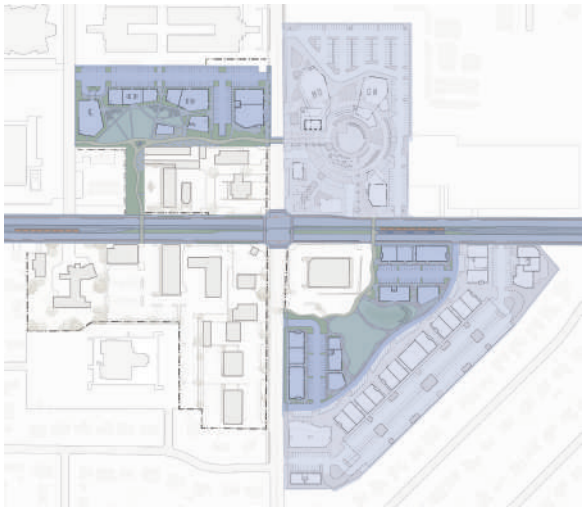
Public safety facilities will be in a building adjacent to 2300 E, on the western portion of the civic center lot. City offices will be located at the back (northeast) corner of the lot. The finger of the parcel that extended to Fort Union would be widened, absorbing the Einstein Bro's lot. This makes room for the cultural center that will stand closer to Fort Union and grab attention from the street into the elegantly designed civic plaza. The beginnings of a civic loop will travel through the plaza, along the inside of the civic center parcel. A restaurant and a cafe'/coffee shop will be located inside of the loop, in the corner parcel as support for the civic center employees and visitors.

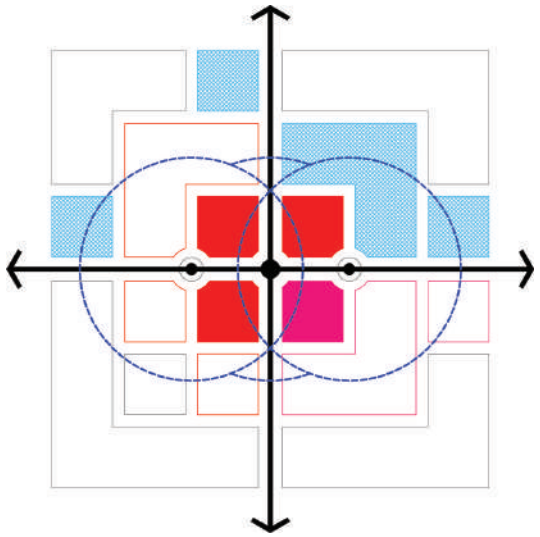
SOUTHEAST ZONE II

The single-story, medium box, existing strip mall will be deconstructed and replaced with three 5-story residential over retail buildings that have smaller footprints and are broken up to increase permeability and access to the new parking. On the edges of the res/retail buildings will be an anchor type retail store (on 2300 E - REI is proposed) and a four story corporate office building (On Fort Union). Behind these buildings, across the parking access, will be additional offices. A parking lot covered by a parking deck will be located behind the new neighborhood retail buildings, freeing up the front of the buildings to be a public plaza that is designed to be flexible for many different uses during all seasons and used as a community gathering place. A softscape bowl on the north

side of the plaza works creates a slope for children to play on both with and without snow, makes way for an amphitheatre, and serves as a detention basin for storm drainage.

In a later phase, Walgreens will give way to a corner "Welcome Plaza" that gracefully handles the grade change and converts it into a series of carefully designed ramps, stairs, small buildings, and mini-plazas. The proposed building uses are an info-center/convenience store, a 2-story events center/ gallery or exhibition space, and a small cafe'/bakery. This plaza flows smoothly underneath a gathering pavilion, across this quadrant's portion of the "Civic Loop", and into the flexible, softscape plaza area. The pavillion is a programmable shade/ rain structure designed to also be a piece of public art that can be rented out singularly or to help handle larger events from the events center. The previously mentioned parking deck will have openings to allow plenty of natural light into the surface level and to allow trees to grow up through, creating a much better feel surrounding the parking. The deck connects to the second floor, making building access for residents much more convenient.





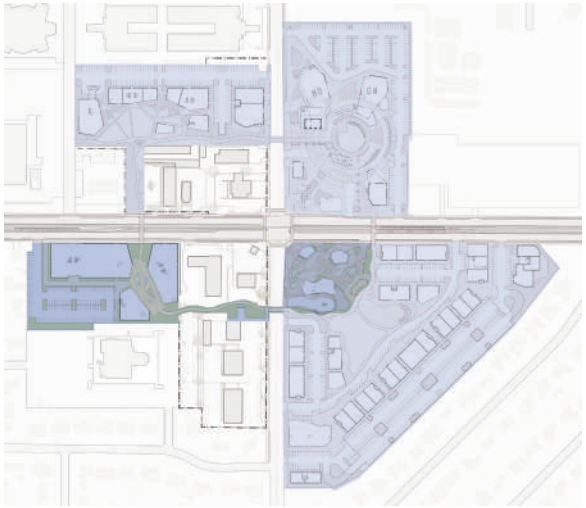
TOD: COMMERCIAL ENHANCEMENT

Southeast Zone II, 7.7 Acres: the phase of the project begins to take the shape of a Transit Oriented Development as the street improvements begins and additional retail, housing and service buildings such as a community center are added. Public parks provide additional gathering places and help to provide habitat in the urban environment

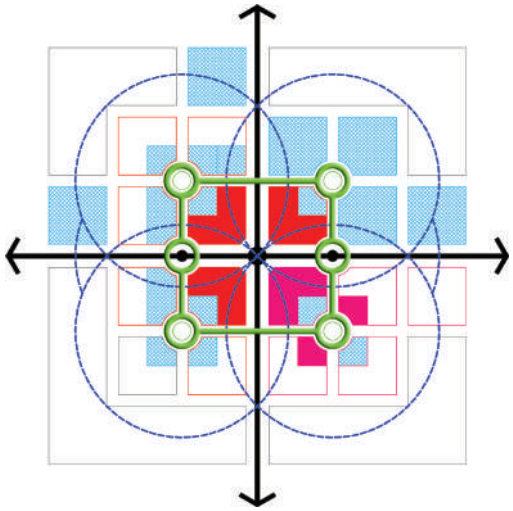
The diagram shows that connections are beginning to form: the four corners of the intersection are beginning to connect and amenities that are within a 5 minute walking distance are expanded. The interior loop of the connections makes it first step toward connecting the whole site

CIVIC NODES: PLACE MAKING
PUBLIC FLOW: INTEGRATION

Northeast Zone III, 4.9 Acres: the pedestrian path now links the site as it moves through the new welcome plaza at the southeast corner, across the street to the new office and retail buildings. This phase likewise provides a new satellite campus and even center



The diagram shows increasing connections between the street and within the development: the pedestrian loop nears completion and creates a strong pedestrian focus to the site. Building infill and redevelopment increases and help to define the spaces better

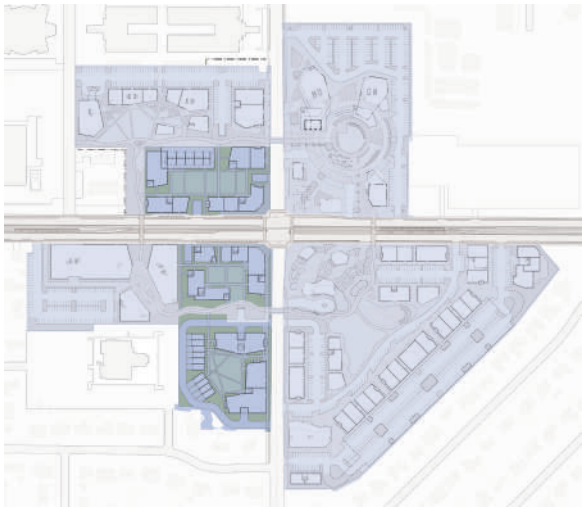


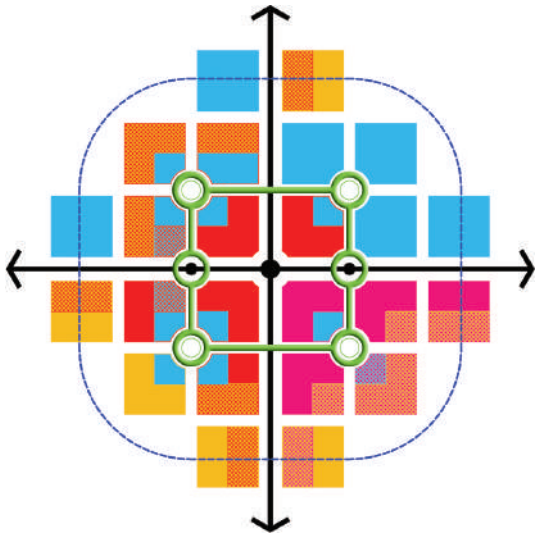
NORTHWEST ZONE III

This site will be established as a community center by providing many different community serving uses. A community center building with classrooms and kitchens will replace the credit union on 2300 E and will be facing the civic center across the street. The civic loop carries through this quadrant, both connecting the loop from the northeast to the southwest and shooting out straight west to connect to the library and elementary school. This trail could also continue to the west and connect to other sites along Fort Union, such as Dan's Grocery store. The current storage shed site will be replaced with more housing, senior care facilities, daycare facilities, some local home and garden retail and exhibition centers & outdoor gardens, park space, and art studios/ galleries. The studios and galleries are directly adjacent to the loop and have programmable exhibition spaces outside where work can be publicly displayed. Festivals and markets can be held in these spaces. The auto repair shop, Lone Star Taqueria, and the bank on the corner will all eventually be replaced with office over retail and residential over retail with a special request that the prime retail location be reserved for and tailored to Lone Star Taqueria.

SOUTHWEST ZONE IV

The carwash and single-story retail site will be replaced by an educational facility, ideally satelite campuses for any of the instate higher education facilities. Square footage and lot space is substantial enough that a well planned campus could support facilities for multiple institutions as well as a central plaza space that adds another moment/room to the Civic Loop. Approaching the corner, the gas station and tire shop will also eventually be seen as under-utilized properties and be supplanted for ground level retail along the street with office above. Off-street office buildings help to form a semi-private courtyard. Moving along 2300 E, the single-story retail buildings give way to the completion of the Civic Loop and eventual construction of underground parking that will support the offices, retail and residential that fills out these parcels as well as the parcel where the 2-story office currently exists.





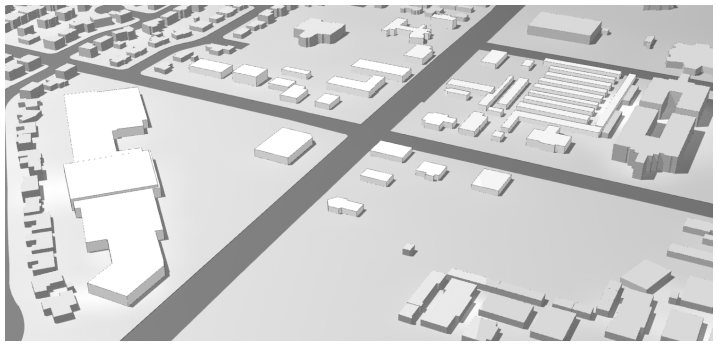
INTEGRATION: PROGRAM EXPANSION

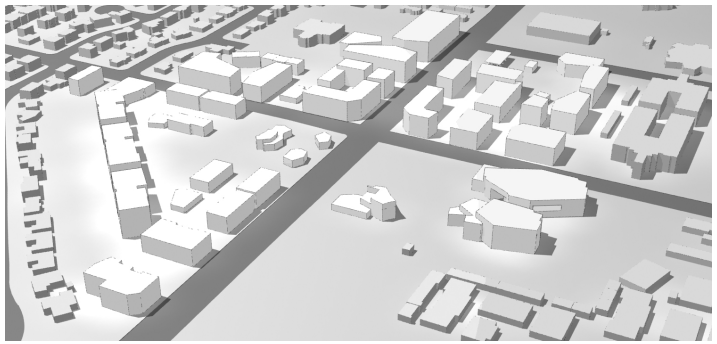
Southeast Zone IV, 5.9 Acres: the completion of the final phase allows the project to act as a fully integrated Transit Oriented Development. Additional high density mixed-use buildings with office and multi-family housing are added that include ground level retail. To provide further housing options single-family attached units are included

The diagram shows the fully realized connections of spaces and uses as the project is fully developed: the four corners of the intersection are now active quadrants that are linked together with pedestrian corridors that further connect into the transit on the Fort Union Blvd. Multiple building uses create options for visitors and residents

DISTRIBUTION OF USES BY ZONE

The Civic Center Proposal will improve the vitality of the street and surrounding neighborhoods. The design provides a number of activities and uses accessible within a 10 minute walking distance and will significantly improve the aesthetic quality. The density and public spaces provided by this model should set a standard for future development in the city and surroundings municipalities as well.





PROGRAM ELEMENTS

	ZONE I	ZONE II	ZONE III	ZONE IV	TOTAL
	Municipal Center	Welcome Center	Community Center	Lifelong Learning Center	
Land Acreage	5.92	11.53	6.49	7.53	***31.47***
Gross Floor Area (sf)	52,000	330,000	358,000	505,000	***1,245,000***
F.A.R.	0.2	0.66	1.27	1.54	***0.91***
Parking Spaces	240	640	370	790	***2,040***
D.U. Per Acre	--	14.74	23.11	18.59	***14.62***
Dwelling Units	--	170	150	140	***460***
Plaza/Park Acreage	1.79	1.87	0.81	0.82	***5.3***
Institutional (sf)	47,300	8,000	35,000	236,000	***326,300***
Retail (sf)	4,700	84,000	54,000	62,000	***204,700***
Office (sf)	--	78,000	67,000	115,000	***260,000***
Residential (sf)	--	143,000	112,000	126,000	***381,000***
Other (sf)	--	--	37,000	--	--

INTRODUCING THE COPPER LINE

THE 'C' LINE VISION

Imagine a city at the base of the Wasatch Front – the City between the Canyons. A city that has conquered the challenges of its two season extremes – a long cold dry winter, and a summer that scorches even the lizards. A place that maintains its high residential quality of life, its sense of safety and neighborliness – but whose downtown has been revitalized with a sense of purpose, a sense of place, and a sense of responsibility to the future. Cottonwood Heights will build a local transit line that its citizens will revere, and other cities will emulate – because it prioritized the needs of its citizens first and invited all others to ride along. Whatever mode the City selects, it will be based in the notions of place, local economy, and community building. It will enhance quality of life and livability for current residents. It will contribute to a sustainable future for the larger region. And it will guard against the threats of climate change to ensure a more resilient Cottonwood Heights.

At the heart of Fort Union Boulevard will be a new transit line, for the time being, dubbed the 'Copper Line' or the 'C Line.' The Copper Line will serve Cottonwood Heights and access to the canyons. It might be a sexy new copper-colored bus in a dedicated lane at the center of the street. It might be a local serving streetcar that provides space at the center of the roadway for Cottonwood Heights to create a Ramblas for the 21st Century. It might be the extension of the regional light rail system to the resorts. Whichever mode is selected, it will host a streetscape that helps to elevate the quality of life for City residents. Fort Union Boulevard and its new transit line can help kickstart the redevelopment of an already successful new municipality. A new town center with shopping, dining, entertainment, and public realm spaces will attract visitors from around the region. A new civic center will be the pride of its citizenry and provide iconic value to the City. New infill development along Fort Union Boulevard will turn it into the Main Street the City deserves.

Cottonwood Heights has all the elements in place to achieve success in remaking its visual appearance, recasting its brand, attracting new visitors, and upping the ante within the region for what can be achieved through transit design. What is required now are the strategies and desire to accomplish the vision. That political will exists is certain, but how can it be channeled? Imagine an evening's walk hand in hand with a loved one down the strollevard; sharing gelato on a warm summer night in the town center; hearing music in a tree-covered amphitheater at the civic center; waiting in line for brunch at the new eco-café on Fort Union Boulevard; jumping on the streetcar to grab the next TRAX train for work. These are the possibilities of Cottonwood Heights' public realm and the new life of Fort Union Boulevard – a place that builds on its assets and current strengths, but is so very different that its current reality.

RECOMMENDATIONS FOR ACHIEVING THE VISION

A series of recommendations for achieving the vision are set out below as a means of advancing an implementation agenda for Fort Union Boulevard and Cottonwood Heights. They are presented with respect to the deepest and most crucial issues first, while less path dependent and more independent strategies follow.

1 UNDERSTAND THE LONGER TERM PRESSURES AND THREATS TO THE CITY

BRAINSTORM AND BUILD ON THE IDENTITY AND REBRANDING STRATEGIES WITHIN THIS STUDY. PLEASE READ THE VISIONS AND DESIGN PRINCIPLES WITHIN THE MONOGRAPH AND COME TO AGREEMENT ON THE VISIONS FOR YOUR CITY. THE DESIGN PRINCIPLES ARE MEANT TO EDUCATE. WHICH OF THEM DO YOU SUPPORT? HOLD A SERIES OF CIVIC ENGAGEMENT EVENTS TO DISCUSS THE FUTURE OF COTTONWOOD HEIGHTS AND THE TRANSIT ALTERNATIVES FOR THE CITIZENS, BUSINESSES AND PROPERTY OWNERS IN THE CITY.

2 UNDERSTAND THE POTENTIAL CHANGES TO EVERYDAY LIFE IN THE CITY

UNDERSTAND THE CONSTRAINTS AND OPPORTUNITIES THAT THE CITY HAS WITH RESPECT TO TRANSIT, STREETSCAPE AND REDEVELOPMENT. DISCUSS THESE WITH THE CITY'S PARTNERS AND STAKEHOLDERS. INVESTIGATE THE TRUE NATURE OF CLIMATE CHANGE FOR THE VALLEY. WHAT WILL TRANSIT INTRODUCTION MEAN TO FREE DAILY COMMUTE? TO A TRIP TO THE GROCERY STORY?

3 CONSIDER THE TRANSIT ALTERNATIVES

WEIGH THE TRANSIT ALTERNATIVES, EXAMINE FEASIBILITY, AND UNDERSTAND THE COSTS AND BENEFITS OF EACH TRANSIT MODE. TEST THESE TRANSIT MODES AND TRAVEL TO CITIES AROUND THE WESTERN UNITED STATES TO SEE WHAT EACH OF THEIR POTENTIALS MIGHT HOLD FOR COTTONWOOD HEIGHTS. DETERMINE THE PRIORITY FOR PUBLIC REALM CHANGE AND THE TRADEOFFS THAT EACH OF THESE TRANSIT MODES WILL REQUIRE IN EVOLVING FORT UNION BOULEVARD.

4 SEQUENCE THE CATALYTIC MOVES

FIGURE OUT WHAT NEEDS TO HAPPEN FIRST TO KICK START THE STREET EVOLUTION. UNDERSTAND THE PHYSICAL DESIGN CONSTRAINTS TO INFRASTRUCTURE CHANGE, POSSIBLE PROPERTY TAKINGS AND THE COSTS OF A NEW FORT UNION BOULEVARD. TALK TO YOUR INFRASTRUCTURE PARTNERS, EXAMINE YOUR FINANCING, APPLY FOR THE GRANTS AND CROSS-SUBSIDIES YOU WILL NEED. COMMIT.

5 CONSIDER THE REDEVELOPMENT AGENDA OF THE CITY

WHAT ARE THE PRIMARY AND PRIORITIZED GOALS FOR URBAN CHANGE? WHAT SITES SHOULD BEGIN SOON? WHICH SHOULD BE PUT ON HOLD? CAN REDEVELOPMENT HAPPEN INCREMENTALLY? CAN WE CREATE A POLICY OF URBAN DESIGN CHANGE FOR INFILL ON FORT UNION BOULEVARD WITH LITTLE DISRUPTION OR COST TO THE CITY?

6 EXAMINE THE REGULATORY AND ZONING STRATEGIES

WHAT ARE THE STRATEGIES AND ZONING ADJUSTMENTS THAT CAN BE CHANGED INTERNALLY WITHIN THE CITY, AND THE PROCESSES FOR MAKING THESE CHANGES HAPPEN? WEIGH THE ZONING OPTIONS AND STRATEGIES FOR ACHIEVING URBAN DESIGN SUCCESS. IMPLEMENT THE ZONING CHANGES FOR DISCREET SMALL PARCELS ALONG FORT UNION BOULEVARD FIRST. COMMUNICATE THE WILLINGNESS TO CHANGE ZONING IN A STREAMLINED MANNER FOR LARGE PARCEL REDEVELOPMENT, BUT DON'T DO IT WITHOUT NEGOTIATING BENEFITS AND EXACTIONS FOR THE CITY.

7 BUILD A FRAMEWORK FOR ACHIEVING THE TOWN CENTER

HOLD CIVIC ENGAGEMENT EVENTS TO DECIDE ON A PROGRAM FOR THE TOWN CENTER, WHILE CONCURRENTLY SEARCHING FOR A DEVELOPER WORTH THE CITY'S TIME. DO NOT SELECT A DEVELOPER OR A DESIGNER UNTIL MOST OF THE IMPORTANT DECISIONS ABOUT CONTENT, PROGRAM AND DESIRES ARE DETERMINED.

8 DECIDE ON A STREETSCAPE APPROACH

FIGURE OUT WHICH STREETSCAPE APPROACH CAN BE MATCHED WELL WITH TRANSIT MODE SELECTION. BEGIN INVESTIGATING MATERIALITY, AND THE AESTHETIC EFFECT THAT IS DESIRED. TAILOR THIS TO THE LARGER DESIRED BRAND OF THE CITY.

9 ACCOMPLISH FIRST, WHAT MIGHT BE EASY

WHILE IT MAY BE AN OXYMORON TO SUGGEST THAT ANYTHING IS EASY IN PUBLIC REALM IMPLEMENTATION, SMALLER AND MORE MODEST PROJECTS HAVE A ROLE IN ADVANCING THE LARGER VISION, AND HELP TO CREATE PUBLIC SUPPORT FOR THE LARGER MISSION OF STREET EVOLUTION AND REDEVELOPMENT.

10 COMMUNICATE THE VISION REGULARLY

TO BE OWNED BY THE COMMUNITY AND PUBLIC OFFICIALS, THE VISION FOR COTTONWOOD HEIGHTS AND FORT UNION BOULEVARD SHOULD BE COMMUNICATED AND REITERATED ON A REGULAR BASIS. THIS NEEDS TO HAPPEN IN A VARIETY OF FORUMS OVER THE LONG HAUL. OWN THE VISION.

APPENDICES

The following case studies are included in the appendices to the monograph here. The students undertook short pointed case study research to understand the benefits of these positive exemplars. Two rounds of case study work were completed as outlined herein. Students studied designs, configurations, impacts, timelines, development issues and key messages from each case.

APPENDIX A CASE STUDIES IN TRANSIT AND STREETSCAPE DESIGN

San Francisco, California's Octavia Boulevard

New York City, New York's Ocean Parkway (boulevard)

Toronto, Ontario Canada's Streetcar System

Portland, Oregon's Pearl District Line Streetcar

Berlin, Germany's Metro Tram System

Los Angeles, California's Metro Orange Line Bus Rapid Transit

Curitiba, Brazil's Bus Rapid Transit

San Francisco, California's Third Street MUNI T Line

Salt Lake City, Utah's North Temple-Airport Trax Green Line

APPENDIX B CASE STUDIES IN URBAN + TRANSIT-ORIENTED DEVELOPMENT

Salt Lake City, Utah's Lifestyle Center: City Creek Center

San Jose, California's Lifestyle Center: Santana Row

Arlington's, Virginia's Transit-Oriented Development: Rosslyn-Ballston Metro Corridor

Oakland, California's Transit-Oriented Development: Fruitvale Village

Medellin, Colombia's Redevelopment Project: Parque Biblioteca España

Denver, Colorado's Redevelopment Project: TAXI

Walnut Creek, California's Redevelopment Project: Downtown

Vancouver, British Columbia's Redevelopment: False Creek North

Portland, Oregon's Redevelopment: The Pearl District

CASE STUDY 1: STREETSCAPE OCTAVIA BOULEVARD

TIMELINE

1989 Loma Prieta earthquake damages the Central Freeway. Prior to this, portions of Octavia Boulevard sat underneath the elevated 101 Roadway connection to the freeway

1998 Voters opt rather than replace the elevated road, they would prefer a proposal be developed to create a new freeway touchdown as the major entrance to the city

2003 Demolition begins of the existing freeway structure

2005 The boulevard is finally implemented. The new design drastically improves the surrounding neighborhood that had been blighted since the 1950's by the freeway

Octavia Boulevard is a boulevard in San Francisco that was built in place of the damaged section of the double decker Central Freeway. Octavia boulevard was redeveloped and redesigned after the Loma Prieta earthquake damaged many sections of the central freeway which had left the neighborhoods and areas below it blighted and extremely run-down.

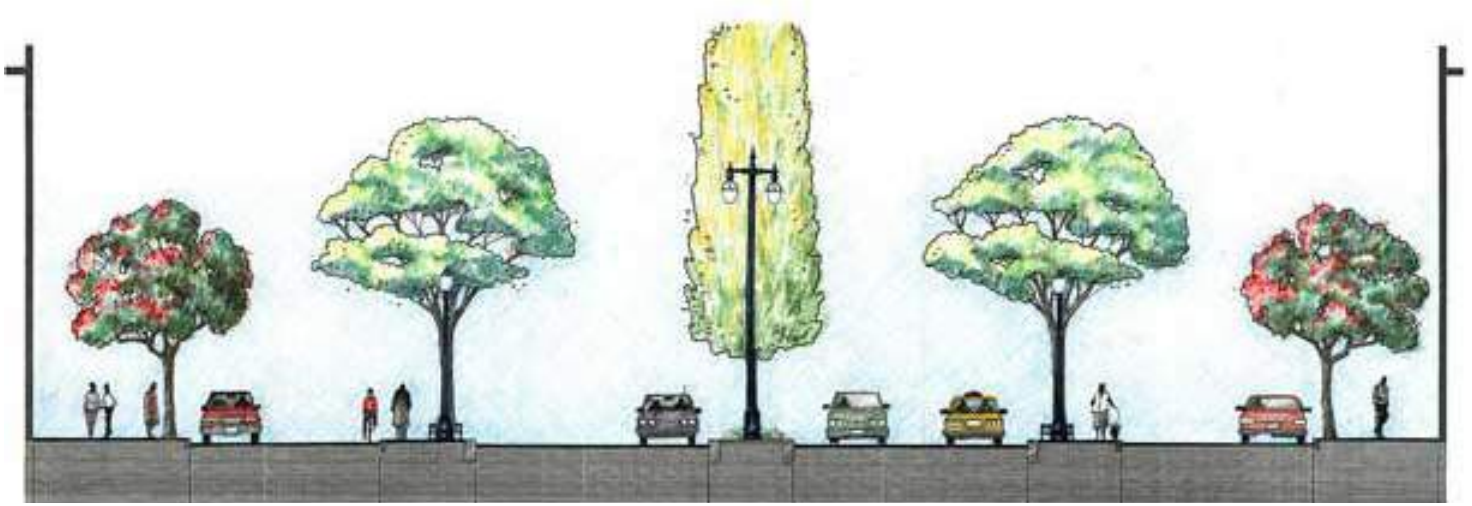
In 1996, the city agreed to tear down the freeway and replace it with a ground level thoroughfare. It was finally built in 2005 after many public hearing exercises. The new multi-access boulevard that boasted the likes of some great Parisian style boulevards revitalized the entire Hayes neighborhood and brought life back into the area. It was designed to be visually appealing, pedestrian oriented and friendly, and became an actual destination for residents of the neighborhood.

One of the boulevards staples are the access lanes on either side that function as local lanes. These access lanes are meant to separate the quicker flowing traffic that are entering and exiting the freeway, while providing access to local streets and businesses along Octavia. Another key design element that was incorporated in the construction of this boulevard is that is a considerable amount of open space and landscaping tree lined walkways, specific light fixtures, pavers, furniture, etc. A park was also include at the top of the thoroughfare that has become a key open space destination for many local residents.

The creation of this multi access boulevard completely turned the economic vitality of the area around. Residents saw an increase in their property and home values, more local artisan shops opened up along the boulevard, and employment in the area rose dramatically.

KEY MESSAGES

- The multi-way boulevard design distributes traffic evenly and has shown little problem with traffic congestion
- Design demonstrates that a large street can be pleasant, functional and safe for pedestrians and cyclists
- Generous landscaping and street tree placement are key to the quality of the street
- Improvements to the street have positive impacts to surrounding property values



Street section of Octavia Boulevard: showing side lanes for local traffic and parking, tree-lined pedestrian walkways and pedestrian and vehicular lighting arrangements

The side lanes act as the designated bicycle lanes: The shared street has proven to be successful for both the drivers and cyclists with few conflicts occurring

Plan drawing of Octavia Boulevard as it intersects with Market Street: This intersection also serves as the freeway entrance and exit. The center lane and side lane tree plantings provide a visual cue for vehicular traffic to slow

CASE STUDY 2: STREETSCAPE OCEAN PARKWAY

TIMELINE

1860's Olmstead and Vaux suggest Ocean Parkway to Brooklyn park commissioners

1868 Land is acquired by the city for the project

1874 Work begins on the parkway

1880 The project is completed

1900's Homes began to be built along the parkway

1950's Activist save further demolition of the parkway from The Prospect Expressway

1975 The parkway is designated as a landmark

1984 The first bike path in America opens, running along Ocean Parkway

Ocean Parkway is a boulevard that stretches approximately five miles north and south through Brooklyn, New York. It begins at Prospect Park and terminates at Brighton Beach. It is one of Frederick Olmsted's designs; proposed in 1860, but wasn't completed until 1880.

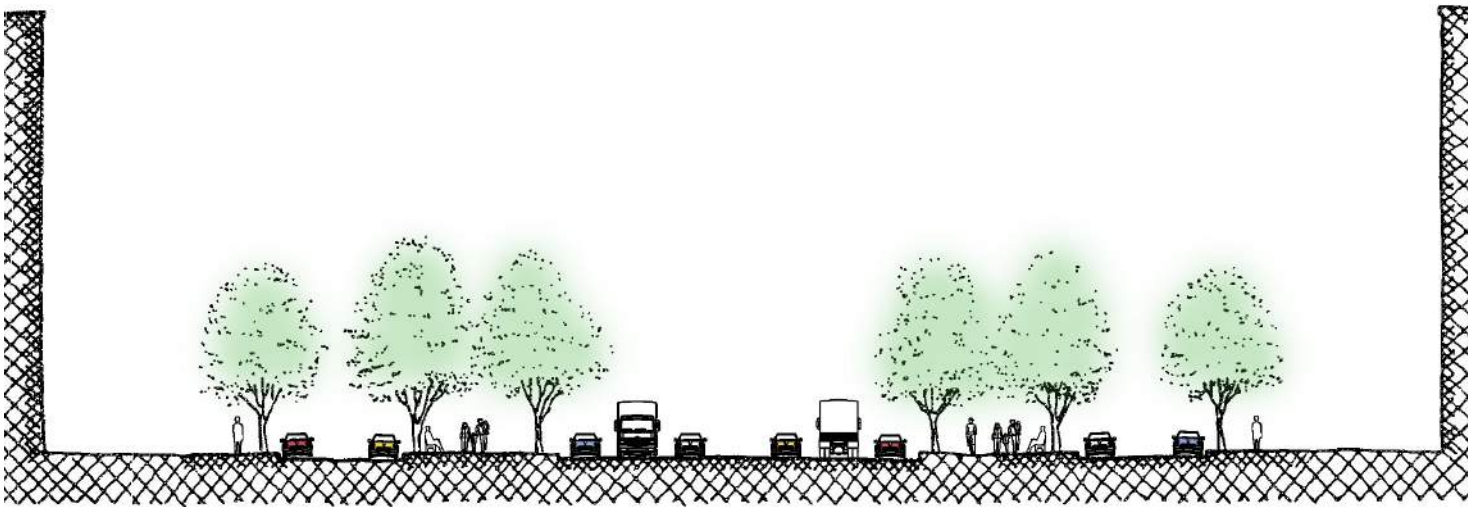
The boulevard has the traditional access lanes separated by large medians from the main through traffic. The medians are wide enough to accommodate for two rows of trees, eight foot sidewalks plus furniture zones, and a bike lane on the western median (the first bike lane in the United States). The bike lane is separated from the pedestrian path with a small raised curb and a handrail. Benches are spaces between every tree on the access side of the medians.

The through travel lanes allow three lanes in each direction with a center turning lane. The access lanes have parallel parking on each side with one lane of travel between them. The access lanes slows traffic considerably as well as reduce vehicular noise. Traffic in the center lanes are controlled by signal lights. All access streets are controlled by stop signs.

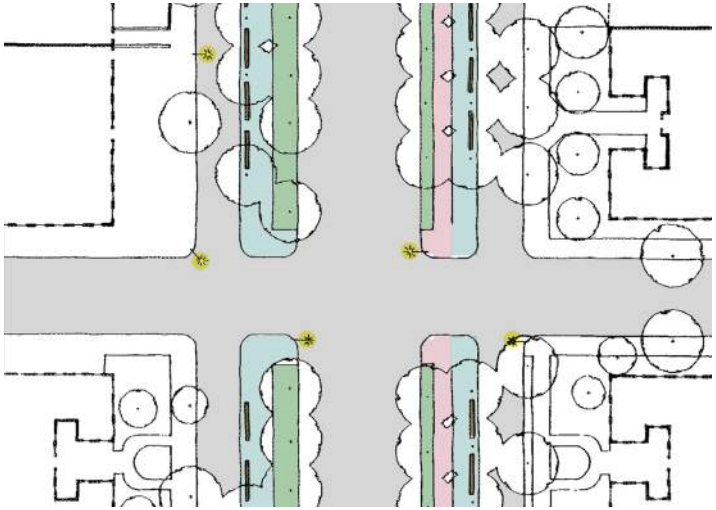
Bus transit is directed to the access roads rather than the main roadway. This allows the bus to stop without interrupting traffic as well as putting the bus stops on the sidewalk rather than the medians. The entire width of Ocean Parkway is just over 200 ft; usually somewhere between 205 ft and 210 ft. Despite the large width of the street there is a reasonable amount of pedestrian activity.

KEY MESSAGES

- The parkway is a large street that carries a large traffic volume, however, by providing ample pedestrian corridors that are well buffered and lined with trees, the street can still maintain the large traffic load while still feeling pedestrian and bicycle friendly
- Separation of the pedestrian path and cycle path ensure conflicts between the two groups are kept to a minimum
- The homes are set back from the street 30', however, consistent street tree planting provides definition to the space
- Passive recreational opportunities are provided on the medians such as benches, tables and chess board tables. These spaces allow members of the surrounding community a place to gather and interact. These spaces are regularly used and seen as favorable despite being surrounded by vehicles on either side.



Street section of Ocean Parkway: shows large 30' tree lined medians of mature maple, oak, sycamore, and elm. Center roadway is 70' wide with 3 lanes of traffic in each direction plus 10' left turn lanes



Plan drawing showing designated uses for the two side street medians: The east side median includes benches, tables and a pedestrian path. The west side median has a designated bike path that is separated from the pedestrian path

Large planted park strip: provides ample separation for the pedestrians to ensure a feeling of safety as they use the median. Side streets provide parking and access to the surrounding homes and businesses

CASE STUDY 3: STREETCAR
TORONTO STREETCAR

TIMELINE

1861 The city began running a horse-drawn street railway

1892 The first electric streetcar was installed, replacing the horse-drawn car entirely by 1894

1940's Despite the trend of many North American cities eliminating streetcars in favor of buses, Toronto continued to invest in streetcar lines.

1966 By this time streetcars were deemed 'obsolete' and an initiative was made to remove all streetcars by 1980. Strong opponents to this plan rallied and helped save much of the existing network

1989 The building of new streetcar routes began and new additions continue today

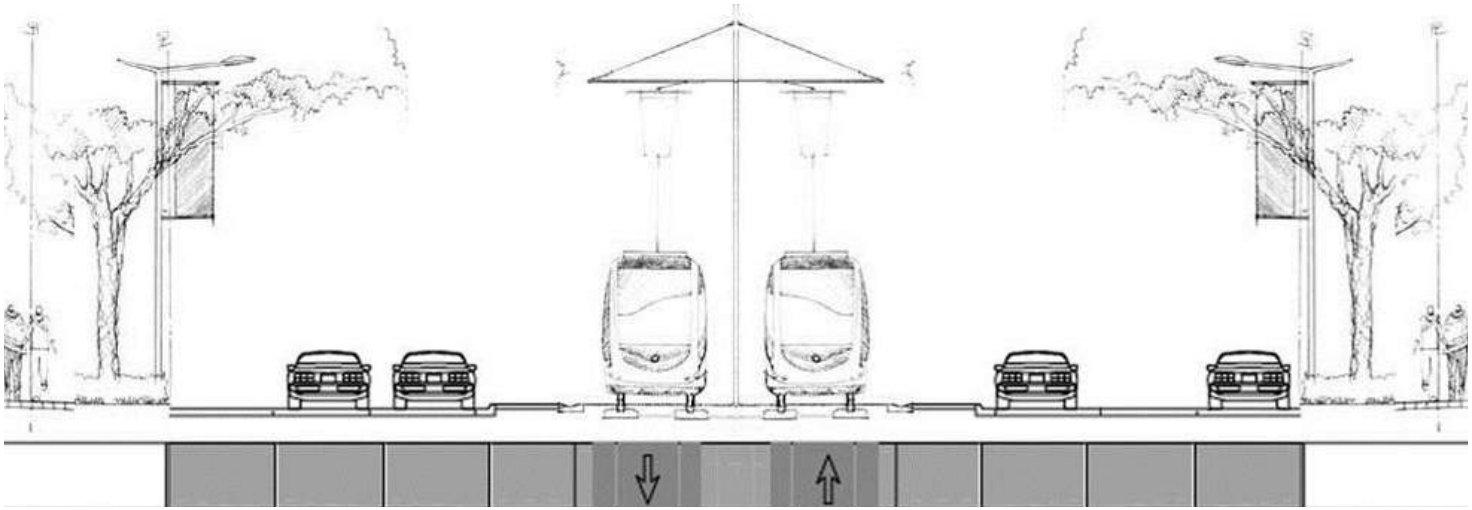
Operated by Toronto Transit Commission (TTC), the Toronto Streetcar System has a long history which began back in 1861. With 285,600 of its ridership in 2010, this is one of the largest streetcar systems in North America: 11 lines, overall 51 miles of system length, 247 streetcars (52 high-capacity articulated cars), 74 persons/car in peak time (in real 150-200 persons), 5-10 minute peak time interval (5-20 minute off-peak time), and so on.

Flexibility and practicality are the two major characteristics of this system. The streetcar lines are located mainly within the downtown area as well as the waterfront. Aside from a few sections, the stops are frequent and designed to make timing and location optimal for the riders. On newly developed sections, streetcars use a median as an private right-of-way, raised curbs, or special traffic signals to increase its service reliability and reduced delays caused by sharing the road with automobiles. The line has several 24 hour serviceable sections.

Different from other countries, Toronto's system is not just for tourism or nostalgia but it has been continuously serving as a major transit strategy. Even though there had been several trials for substituting with other mass transportation, such as bus, the citizenship had not allowed to accept that and forced governing municipalities to change their decisions. The Toronto streetcar system directly integrates with its daily life, as a major public transit alternatives.

KEY MESSAGES

- The Toronto streetcar still runs successfully on the standard streetcar model with street trackage shared with car traffic, proving that a designated right-of-way is not always necessary
- Despite efforts to remove the lines, it was shown that the locals favored the streetcar and opposed alternative transportation options
- The Toronto streetcars do not remain as part of a heritage streetcar system that exist only for tourism or nostalgia. They are an integral part of the downtown transit system and the look of many of the cars makes them an iconic part of the downtown identity



Section of downtown street configuration: the streetcar at times has a dedicated right-of-way with the loading platform found in the center of the street. Other times the streetcar shares a lane with traffic, and in some future proposals the road will be closed off entirely to traffic and will only allow the street car use of the street

New streetcars are being introduced to the fleet: these cars are designed to be larger in order to accommodate more riders. They are articulated and low-floor models to make them more accessible as well

The iconic streetcars as they travel through downtown: older cars have been refurbished and are still used on some lines, but for the most part the classic red cars are what are identified as part of the Toronto streetcar system

CASE STUDY 4: STREETCAR PORTLAND STREETCAR

TIMELINE

1990 Planners begin consideration for a plan that recommends a streetcar system for the city. The original intent was a faux-vintage streetcar that would be called the Central City Trolley. The plan was changed to a modern streetcar as the developers did not want the system to be seen as a tourist attraction but rather as a form of transportation

1993 A fleet of modern low-floor cars are selected for the line

2006 An extension is added as part of the first phase of the plan to connect to redevelopment areas

2008 Studies indicated that the creation of the streetcar prompted the construction of 10,000 new housing units as well as several million square feet of retail, office and institution buildings

2012 The latest in its continuing lines opened for service

The Portland Streetcar is an excellent example of a public transportation project that met the City's revitalization goals while maintaining the scale and identity of the existing neighborhoods. The streetcar is a looped system that passes through the core of downtown Portland. The streetcars rolling stock is 8 feet wide and 66 feet long, which allows for approximately 120 passengers per car. The cars are ten inches narrower and one-third the length of Portland's MAX light rail system, which operates a double car train. The smaller and lighter system uses shallower track slabs, allowing the streetcar to connect to the MAX system if need be.

There are fifteen minute intervals between trains with an average speed of 10-15 mph in the downtown area, reaching a top speed of 40 mph if necessary. The reduced speed and size of stock allows the streetcar to operate in mixed-use traffic lanes, instead of requiring its own right-of-way like the city's MAX light rail system. Operating in mixed-use traffic lanes minimizes construction costs and utility relocation, and does not require the buying of right-of-ways. Portland's existing traffic patterns and parking have only been minimally affected. The streetcar does not impact the flow of traffic because it mainly runs on one way streets. On street parking is plentiful and is interrupted simply to create a streetcar stop every two to six blocks, or 250-1500 feet.

Stations are raised platforms that connect to the sidewalk replacing a section of the eight foot street parking with a small covered shelter. Most stations are equipped with a real time arrival system.

The main achievements of the Portland streetcar system are the linking of neighborhoods while preserving street patterns, infill development and the economic revitalization of downtown. Previously, Portland, Oregon's city core was being depleted of its residents, businesses and thus economic capital. The streetcar was the catalyst that rejuvenated downtown and connected it to the surrounding districts. The nature of the streetcar system preserved the scale and identity of existing neighborhoods, but also contributed to and refreshed the overall character of Portland, Oregon. The Portland, Oregon streetcar is the poster child for progressive planning and has become a premier example of economic revival through the successful integration of public transportation systems within a current neighborhood.

KEY MESSAGES

- Existing traffic patterns and parking have only been minimally changed
- Encourages more development and infill along transit line
- Mixed-use lanes minimize construction costs and do not require the buying of right-of-ways
- Implementing public transportation can be the catalyst for economic revival

A typical street section showing through a one-way street: The raised platform for loading dissipates into space for on-street parking in this configuration. The narrow one way streets allow for large sidewalks for pedestrians

A current route map through the city: the thicker yellow, green, blue and pink lines are the MAX light rail, the thinner aqua and lime green lines are the Portland streetcar. A transit-only bridge is being constructed over the western side and will accommodate buses, pedestrians, cyclists and the streetcar

The streetcar passes through a plaza on the Portland State University campus: as the streetcar moves through the downtown area it often moves through pedestrian spaces such as plazas or streets closed to vehicular traffic. The shared space is safe and there are no conflicts between the pedestrians and streetcars

CASE STUDY 5: STREETCAR BERLIN METRO TRAM

TIMELINE

1865 The Berlin tramway network begins as a horse tramway, making it one of the oldest in the world

1881 The line begins to use an electric tram

1930 The network had more than 90 lines and a network of over 390 miles

1949 The end of WWII results in the operation being divided by East and West Germany, with West Berlin completely shutting down the lines by 1967

1992 The reunification of Germany brings the system under the BVG again. After that time, the re-establishment of the tram line is initiated

The Berlin Metro Tram is an extensive tram (or streetcar as a more common name in the United States) network that services downtown Berlin as well as outlying areas. The tram also connects to an additional network of bus, subway and train systems. The network is one of the oldest in the world, however, it has gone through extensive rebuilding after many of the lines were removed after World War II. There was concern as the tram lines were rebuilt that there would be a conflict between automobiles and the streetcars. These concerns were proved to be unfounded and the two have shared the street with little conflict.

The BVG, the main public transport company of Berlin, began in the late 2000's testing new "Flexity" trams for their system. These car types were designed specifically for the city. The new trams are designed as low floor trams and can be either 5 or 7 modules long. The capacity of the trams range from 116 to 165 people, depending on the number of modules used. Stops are located approximately every 1,500'. The speeds can range from 11 mph to 45 mph, allowing quick passage through long stretches and slow speeds for inner city routes.

In larger streets the trams have a designed separate lane that are often designed vegetated medians of wildflowers. Since 1995 Berlin has "greened" more than 12 miles of tram tracks In other sections the tram and automobile occupied the same lane. The tram also runs through plaza spaces, with no physical separation between pedestrian space and the train line. In a cost comparison it was found that the tram has the lowest cost of energy per vehicle-kilometer as compared to the bus and underground train. The new "Flexity" trams have allowed the BVG to reduce the number of vehicles in their fleet as the new cars are longer and able to carry more passengers.

KEY MESSAGES

- The Berlin tram cars were designed specifically for the city, thus creating a more efficient system
- After reintroducing the trams to the streets, it was shown that the trams and vehicles can occupy the same space without conflict
- Trams can move through pedestrian spaces without conflict, such as in plaza spaces where there is no separation between the pedestrians and the tram line
- The city does not rely solely on the tram but rather connects to other transit options such as bus and train makes network more effective
- Having the stops located every 1,500 feet allows for more users to be able to quickly access the tram closer to their destination

Street section of part of the Berlin tram system : The configuration of the streetcar is not always center loaded as the tram changes multiple time from a shared street configuration to a designated right-of-way alignment

An aerial view shows the center loaded configuration of the tram : In larger streets these right-of-ways are planted with grass or wildflowers, providing a greenway through the streets

The new specialty designed "Flexity" tram cars : these cars are low to the ground to allow street access without a platform. Likewise, the cars can be easily accessed by bicycles, wheelchairs and strollers.

CASE STUDY 6: BUS RAPID TRANSIT THE METRO ORANGE LINE

TIMELINE

1904 A rail service begins operation as part of the Southern Pacific Railroad Burbank Branch Line

1952 After some intermittent years of off and on service, the rail line is discontinued

1991 The LA County Transportation Commission purchases the former rail right-of-way, including several others for future transportation projects. Originally the thought was to create a subway extension

1998 Legislation prevents the building of a subway anywhere in the county using county sales tax funding

2005 A local citizens' group not happy with the project put a temporary 30-day shutdown on the project

2005 The line opens at a completion cost of $324 million

2007 Construction is completed

The Metro Orange Line is a Bus Rapid Transit (BRT) system in Los Angeles County. It is operated by the Los Angeles County Metropolitan Transit Authority, and connects the northern terminus of the Metro Red Subway line in North Hollywood to Chatsworth. The route is 18 miles long, and runs along the former Southern Pacific Railroad Burbank Branch railroad right of way.

There are stations located at 1 mile increments, with most surrounded by park and ride lots. Users pay for their fare ahead of time using TAP cards, and can board special Metro Liner buses at the front and middle of the bus. The articulated buses are around 60 ft. long and can carry about 84 passengers at one time.

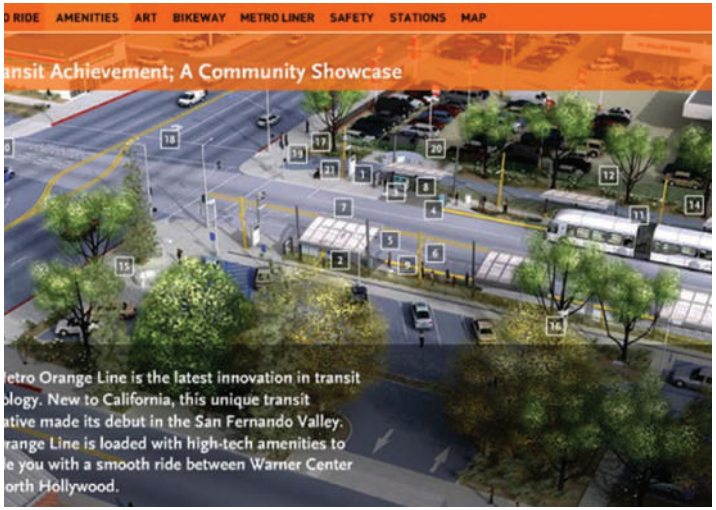
The buses run at relatively short headways, with a new bus arriving at a station every 5-15 minutes. Along with the ability to avoid regular traffic delays due to its dedicated right of way, this system also allows buses to use signal preemption to manipulate upcoming traffic signals ahead of a bus to minimize stops and time wasted at red lights.

This system is one of the most effective bus rapid transit systems in the country, and provides a user experience that is more akin to light rail than a regular city bus. Unlike regular buses, BRT buses only stop at stations, which improves reliability and travel speeds. Buses that operate in the Orange Metro Line are painted silver and have special branding that distinguishes them from regular buses. Overall, the Orange Line is able to provide a high quality transportation system that can transport a large number of people quickly and effectively. By emulating the look and feel of rail transit systems, the system is able to show that BRT is a viable high capacity transit option.

KEY MESSAGES

- BRT can work in suburban locations
- BRT can work as effectively as light rail transit
- Unique branding ,coloring, and interior gives the system a higher quality feel vs. regular bus
- Connecting to existing transit systems is important for ridership
- BRT is a good value for the money because it is less impactful on its surroundings and has greater flexibility in its alignment

The Orange Line Busway section shows the right-of-way given to the buses as well as pedestrians and cyclist: The Orange Line runs through the city as well, where it does have its own right-of-way, but does not include the bike path



The Orange Line Busway: as part of the BRT design a landscaped busway was created. The busway includes a 14-mile pedestrian path, crosswalks, lighting and fencing. The design also included environmentally friendly bio-swales

The Metro created an extensive information campaign and online effort to educate residents on the Orange Line: Amenities for riders as well as cyclist and pedestrian were highlighted. Likewise they addressed how to best use the new BRT system

CASE STUDY 7: BUS RAPID TRANSIT CURITIBA BRT

TIMELINE

1943 A comprehensive plan for the city is developed that envisions extensive automobile growth

1965 A new plan is created after fears that the previous plan would lead to unmitigated growth and congested streets

1974 Curitiba opens the worlds first Bus Rapid Transit system

1991 A survey shows by this time the BRT has reduced approximately 27 million auto trips per year and saved annually over 700,000 gallons of fuel

2010 1,100 buses make 12,500 trips every day and service more than 1.3 million passengers

The Bus Rapid Transit system of Curitiba, Brazil is one of the most well known and studied examples of this mode of transit. The success of the BRT has been a major contributor in making the city livable and free from congestion. The Curitiba BRT is one of the most heavily used transit systems in the world. At the same time it is maintained at a relatively low cost.

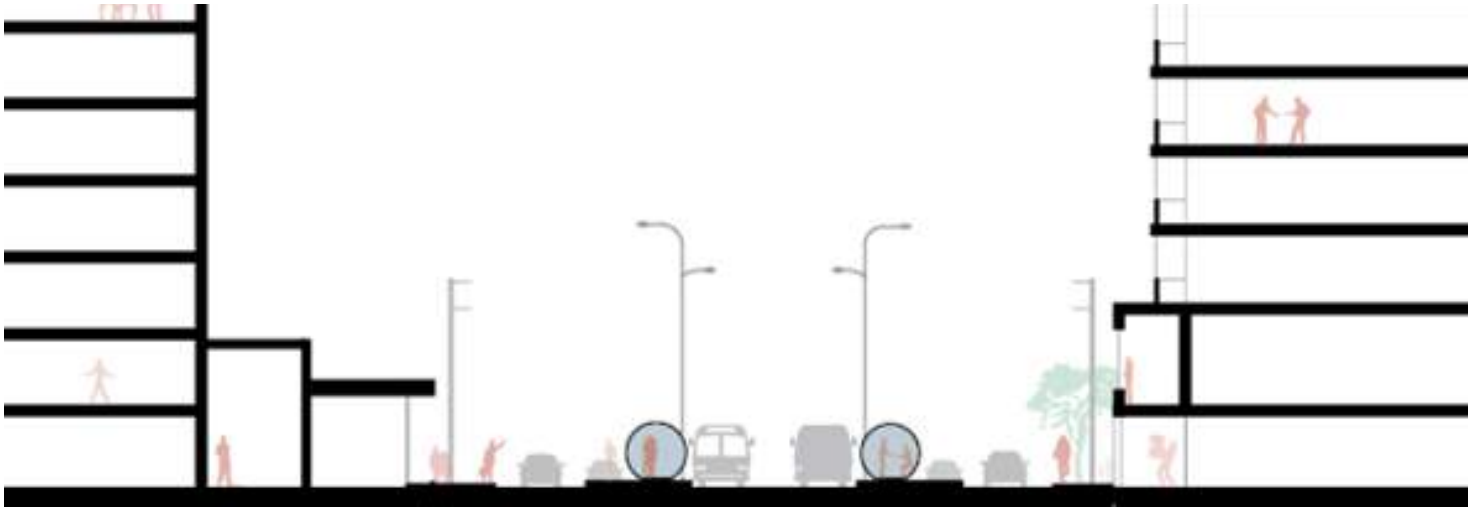
The system operates similar to a subway, with the exception of being above ground. The buses move unimpeded by traffic signals and congestion, ensuring fast and efficient services. The wait time at platforms is minimal, with some lines running as quickly as every 90 seconds The fare collection occurs before entering the bus, preventing wait time at stations.

The bus system is hierarchical. Smaller buses run through residential areas which then feed the riders to the larger buses that run in the city and around the district. The core of the system are the five main arterials that lead to the center of the city.

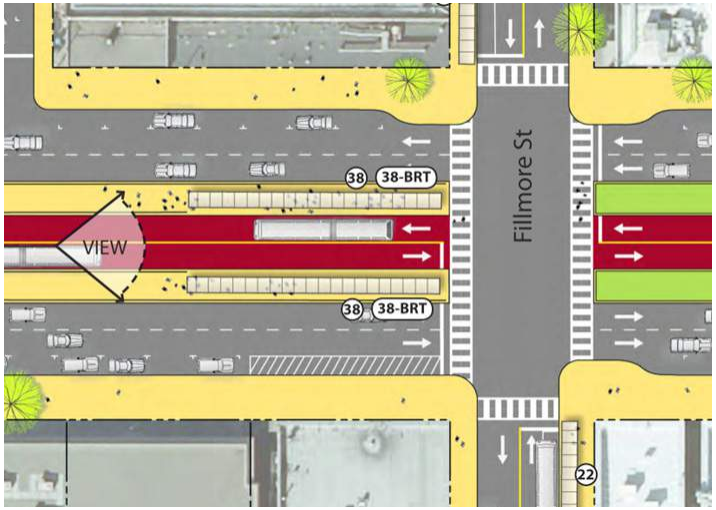
This BRT is the result of city leaders taking an active role in dealing with congestion issues. By limiting growth in the central area, the planners focused on encouraging commercial growth along the transport arterials radiating out from the city center. The city also began closing down some streets in the center to vehicles and created pedestrian streets. By focusing development along the transit corridors, planners were able to change the traditional model of employment typically being focused at the city center. This prevents the morning and the morning and afternoon bottleneck of traffic that results when all are trying to arrive and leave at the same time from one location.

KEY MESSAGES

- BRT system is well managed and organized to accommodate the citizens needs of travel
- The start up cost of the BRT system is much cheaper then a light rail or TRAX system
- The system allows for much more flexibility and change if needed
- The zoning laws (in Curitiba, Brazil) allow for the highest density construction to be made along the bus lines
- In most cases the BRT system (in Curitiba) is faster than private automobiles
- The buses are powered by biofuels that are grown locally, demonstrating effective, sustainable fuel alternatives



Street section shows the basic model for the Curitiba BRT: there is a physically separated median for bus lanes flanked by service streets. The tube stations serve as fare collection as well as the raised platform for the bus



A proposed drawing for a future San Fransisco BRT is designed after the Curitiba model: the BRT runs in the dedicated right-of-way with all loading and unloading at the center of the street

The unique platforms for the BRT system streamline entering and exiting the bus: passengers pay before entering and wait in the tube station. By pre-paying loading is done at a considerably faster rate and maintains a more efficient service

CASE STUDY 8: LIGHT RAIL
T THIRD STREET LINE

TIMELINE

1861 Horse drawn cars begin to be used on Third Street

1894 Known as "Tree Street", electric streetcars begin to run up and down the line connecting the downtown with points along the Bayshore corridor

1886 The new electric lines are completed on what was the fourth longest street in San Fransisco

1941 Due to a succession of misfortunes and bureaucratic decisions, much of the Third street lines were converted over to motor coaches and the tracks were removed

1999 The design phase begins for re-establishing the streetcar, this time being built in an exclusive right-of-way, making it a light rail system

2002 Construction begins

2007 Construction is completed

The T Third Street Line of the MUNI Metro system in San Francisco, California serves as an example of a light rail system extension. It provides a train-transit option on the east side of San Francisco from downtown south to Sunnyvale. The T line is a part of the transit network expansion planned in conjunction with economic development for the region. As such, it fits within many per-existing parameters.

The center-loaded rails and stations fit within the over 100 foot road right-of way. Two sets of two lanes of auto traffic, a bike lane, and a sidewalk allow for continued transit mode choice. Used for the rest of the MUNI Metro train system, the Breda LRV Type 8 rolling stock capabilities include a maximum speed of 55 miles per hour, vertical grade of nine percent, and turning radius of 42 feet. The stock holds 154-166 passengers (46 seated, 108-120 standing, 2 wheelchairs). Like the rest of the MUNI rail system, the service frequency runs between 10-20 minutes. MUNI knew it had the necessary ridership as the line replaced the #15 bus route.

The transit stops occur at least every half mile. Each stop includes a covered waiting area with seating. The center-loaded station platforms rise via accommodating-ramps to the train floor. The design of the rail route included landscaping the space between the sets of rails to enhance the street rather than leave a lifeless void.

KEY MESSAGES

- Design of light rail was able to work within existing right-of-way, requiring minimal to no expansion of the street in order to complete the project
- The project was an expansion of an existing light rail vehicle transit system that likewise has additional future expansion plans
- The light rail replaced an existing frequent-service bus route and has proved to be a more effective transportation option for the rides
- The improvements linked neighborhoods targeted for economic development with the city center
- By building in the median space the city was able to utilize the right-of-way for both the light rail cars as well as trees and other landscape improvements

The T Third Street section shows the center loaded platform: the light rail line is a true light rail system, maintaining a consistent separation from vehicular traffic. All stations are ramp accessible and have covered seating for waiting

The tree lined medians proved a visual improvement to the street: the project introduced other improvements as well as sidewalk treatment, street lighting, art work enhancement and attractive paving materials at the stations

18 new stations were built along the line: some were built between the tracks and others with a station on either side. Stations along the route are designed with a distinctive marquee pole with a sculpture or mobile

CASE STUDY 9: LIGHT RAIL SALT LAKE CITY TRAX

TIMELINE

1980's Discussions begin for serious consideration toward alternative transportation to the I-15 freeway

1988 $5 million dollars is approved by congress to act as funds to preserve land along the proposed light rail corridor

1995 A successful bid for the 2002 winter Olympic games allows the city to accelerate obtaining funding for the project

1997 Construction for the project begins, with protesters claiming light rail would be dangerous and a waste of money

1999 The north-south line is completed and services begin with great success, soon communities are seeking extensions

2001 A line to the University of Utah is completed

2013 The Green Line is completed to the SLC Airport. Plans for additional lines continue to be developed

The TRAX light rail line on North Temple in Salt Lake City, Utah displays some elements of good urban design revolving around a center loaded light rail concept. The design on North Temple addresses several potential problems with the center loaded transit by converting them into opportunities. Adding a chicane to the streets at the station locations introduced a horizontal traffic calming element, decreasing vehicular speed and increasing pedestrian comfort and safety. The chicane has been used as an opportunity to bring a vegetated median into the street.

The median that is made possible through the chicane also provides a pedestrian refuge for the mid-block crossing that accesses the TRAX station. The mid-block crossing increases walkability in the neighborhood surrounding the TRAX station. As the chicane nears an intersection, it recedes to open up a left-turn lane, solving another potential problem of the center loaded light rail scheme.

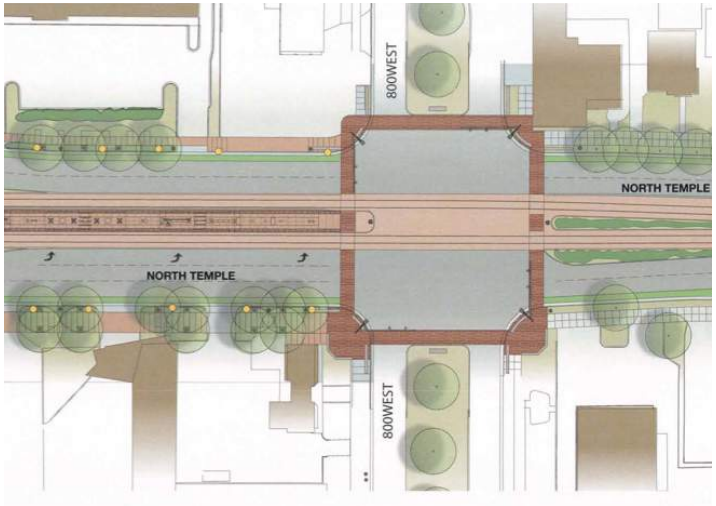
All of these elements (traffic calming, mid-block crossings, vegetated medians, and left turn lanes) enhance the environment surrounding the stations in one way or another. With thoughtful problem solving, they can be established through means other than a chicane as well.

As a whole, the system runs with 81' articulated cars that include 64 seats and room for 236 at standing capacity. There are 50 stations and over 44 miles of track in place right now. During the weekday the trains run at 15 minute intervals and then go to 20 minute intervals during the weekend. In the downtown area the stations are located roughly .3 miles apart. The Trax system connects to a larger transportation network that includes a commuter rail named FrontRunner that runs along the Wasatch Front corridor.

KEY MESSAGES

- Horizontal traffic calming is an effective means of enhancing the pedestrian environment and creates other opportunities
- For larger streets, such as those found in Salt Lake City, mid-block crossings increase walkability/livability and support access to a center-loaded scheme
- With a center-loaded system, it is an opportunity to create vegetated medians that add aesthetic value and comfort
- Through creative planning it is shown that it is not always necessary to eliminate left turn lanes to make room for light rail

The section for the TRAX line shows a center-loaded raised platform design: the large center medians are landscaped along the rail edge, providing an improved visual quality to the street. Trees and lights line the edges of the street



A plan view shows intersection treatment for the design: planted medians are removed to allow for left turn lanes. Colored paving materials delineate the crosswalks, rail line and roadway from each other and improve the aesthetic quality of the street

The Green Line utilizes its namesake and creates visual resonance: not previously seen with the other TRAX line, this line is easily identifiable with green street lamps, power poles, furniture and greater use of vegetation along the line

CASE STUDY 1: LIFESTYLE CENTER
CITY CREEK CENTER

TIMELINE

1990's The mall located on Main Street began to show a drop in sales figures and was becoming no longer viable

2003 The LDS church purchases the mall in an effort to revitalize the area surrounding the church's world headquarters

2006 A concept design is completed and demolition work begins

2010 Residential properties begin to open

2012 The project is completed

The City Creek Center in Salt Lake City, Utah is a mixed-use development that includes residential buildings, office and an open-air shopping center. City Creek incorporates nearly 20 acres, or three blocks of downtown Salt Lake City. The City Creek Center is a privately funded project through the Taubman Center Inc. and City Creek Reserve, Inc., the commercial real estate division of the Church of Jesus Christ of Latter-Day Saints. Other project partners include two Utah based companies, Cowboy Partners, a residential and management company, and Harmon's Grocery Store, which owns and operates the grocery store on site. The construction cost was approximately $1.5 billion and was completed without public subsidy.

City Creek is part of a sustainable design project that began in 2006. Through sustainable design practices the City Creek Center earned a LEED Silver-Certification. The goal of the project was to revitalize Salt Lake City's downtown district and turn it into a thriving economic and cultural center. One of the main accomplishments of this project was its survival during the 2008 recession. Six acres of green space are incorporated, including fountains and a stream that runs through the center of the development, representing the original City Creek. More than fifty percent of the debris from the demolition process was recycled in order to reach the LEED Silver-Certification. People can reach City Creek through a variety of transportation modes. The mall features a retractable glass roof, which is opened in the summer to create the open-air mall and closed during winter. It is only the second roof of its kind in the world.

There are 111 units located above the retail, and 425 condos in the residential towers. The builders of City Creek were conscientious to keep the majority of the 2.1 million square feet of existing office buildings within the development. Since opening in 2012, the City Creek Center has successfully incorporated a mixed-use program into an upscale development, which has ultimately put Utah on the map. The U.S. Green Building Council praised the City Creek Center for, "employing new-urbanism practices by choosing locations and designing projects that are transit-oriented and encourage walkable communities and more efficient energy and water use."

KEY MESSAGES

- Privately funded projects are a viable redevelopment model
- Mixed-use developments can be both environmentally conscious and upscale
- New retail developments can be detrimental to existing shopping centers that are in close proximity
- Pedestrian and public transit friendly developments can boost the economy

An aerial view of the City Creek Center shows the various uses in the project: the extensive project covers over two city blocks with residential, office and retail uses. Also visible in the plan is the controversial sky bridge that crosses over Main Street

An image taken from the northwest corner of the project: shows the project in the core of the city center. The Gateway Mall, built roughly a decade before, is situated more towards the edge of the downtown area

The City Creek replica stream cascades down a waterfall into a large pedestrian plaza: other natural elements of Utah's surroundings were included in the design, including animal footprints etched into the stones, artwork of the mountains, canyons and foothills and native plant materials such as Quaking Aspen

A fountain in the plaza features nightly fire and water performances: elements such as the multiple water features in the project helped create the unique identity of the mall

CASE STUDY 2: LIFESTYLE CENTER SANTANA ROW

TIMELINE

1961 The area was built as a shopping center known as Town & Country Village. Over the next few decades the shopping center began to decline both in appearance and revenue

2000 The Santana Row project was proposed to revitalize the area and bring in higher end housing and retail

2002 Two months before opening a fire broke out and destroyed 538,000 square feet of retail and housing

2004 Two years after its opening 92% of the retail space was leased

2008 The success of the project allowed developers to add an additional 65,000 square feet of Class A office space

2011 100% of the rental homes were leased

Santana Row was a mixed-use redevelopment project in the heart of Silicon Valley. The development covered 40 acres of land and cost $595 million. It was modeled after Las Ramblas in Barcelona. It is comprised of a mix of high-end and mid-tier retail (local and chain) stores as well as Class A office space. It also includes over 500 residential units (220 privately owned condos and 295 rental townhomes and flats). The development also includes amenities, such as movie theaters, spas and salons, restaurants and hotels.

The project was created by Federal Realty on what was originally a greyfield site. The developers felt there was a need for higher quality rental housing and retail in Silicon Valley.

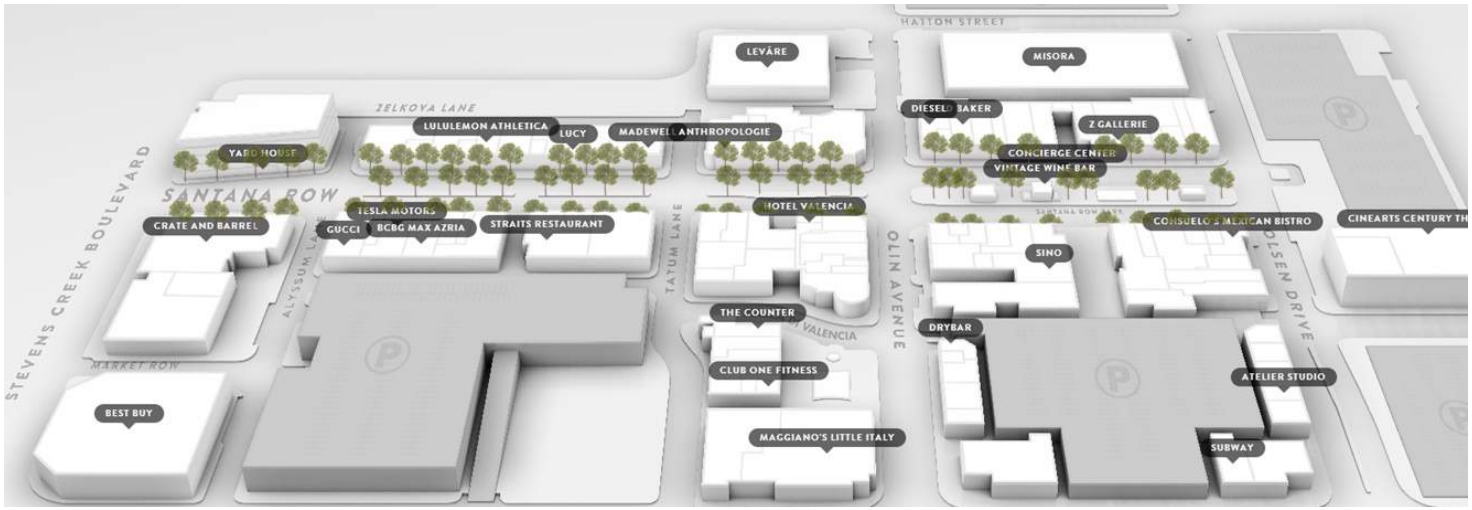
The design for the project consists of small blocks and grids. The small blocks help to increase pedestrian circulation and make the site human scale. The pedestrian streets function as the main civic spaces in the neighborhood. The housing, retail and restaurants have all been oriented towards the street.

The architects commissioned for the project were sent to France and other locations to garner ideas for the project. As a result the design and feel of the site is distinctively European. They even went so far as to import the facade of an old French chapel and place it at the front of a wine bar. These old-world elements contribute to creating a place with distinct character.

Santana Row turned commercial real estate into an exciting destination retail center for San Jose. The mixed-use of retail and office space provides an engaging perimeter while still allowing for private space for its residents. The buzzing nightlife combined with a convenient location to live has made this development a success story.

KEY MESSAGES

- Mixed-use living creates opportunity for work and spend leisure time where you live, creating choice and options for residents
- Town center like development allows patrons to park once then walk to spend hours shopping and dining
- Public realm is created by activating the street with various activities such as live music, car shows, and farmer's markets



A plan of the site shows the building configuration in a grid pattern: the street features mature streets preserved from as well as a row of new plantings. The tree lined streets add to the appeal of the project

The street is closed for its weekly farmers market : every Sunday morning Santana Row hosts a farmers market that brings in high end produce and goods

A large pedestrian median runs through the street: on the median there are fountains, fireplaces and chairs for relaxing, restaurants and outdoor seating. A portion of a French church has also been added to the street

CASE STUDY 3: REDEVELOPMENT
THE TAXI DEVELOPMENT

TIMELINE

2000 Mickey Zeppelin, owner of Zeppelin Development, purchases the brownfield site near the river which housed the former Yellow Cab headquarters

2001 After extensive clean up efforts the redevelopment process begins, including the developer moving the offices into the project area

2003 Phase 1 of the development is completed. The re-purposed building provided spaces for new businesses as well as the new FUEL Cafe

2008 TAXI 2, the new mixed-use building opens

2012 FREIGHT, the mid-century freight house is completed

2014 Because of the success of the initial phases, the next building, TAXI 3, has begun the development process

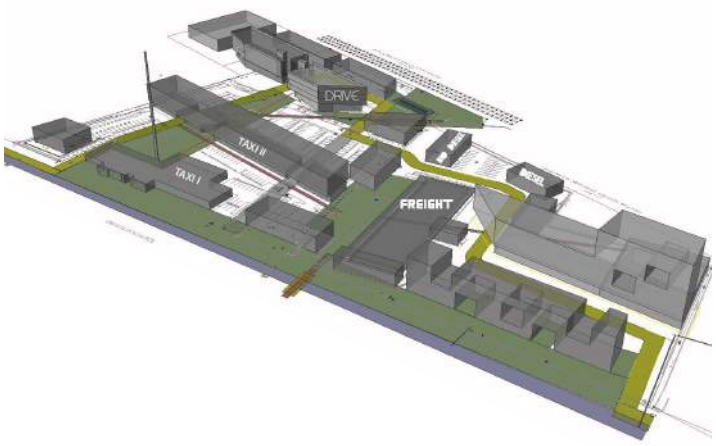
The TAXI Development in Denver, Colorado was undertaken by Zeppelin Development Inc, the same developers who played an active role in the rise of Lower Downtown as a highly successful redevelopment district. The development has taken place at an underutilized industrial site bordering a rail yard. The property consisted in large part of rarely used surface parking lots.

TAXI started in 2000 with the TAXI I building, which is office and studio space. The development has since grown incrementally, starting with the TAXI II building that included commercial flex space and some residential. By 2011, TAXI was fully leased and starting on a sixth building. It continues to be fully leased out as a niche business park for new economy businesses, some of which have started at TAXI in smaller spaces and have expanded into larger spaces as they have become available through later phases of design.

Adaptive re-use has been one of the main drivers of design. For example, a plaza was built over the existing asphalt of a parking lot, which had sections cut out for planting and other re-used materials. The development has evolved into something slightly different from what the original plan looked like, but stayed true to the principles upon which it was started. Other developers have taken notice of TAXI's success and now the whole River North (RiNo) area is seen as up and coming.

KEY MESSAGES

- An incremental approach to development provides flexibility to adapt to changing demands and circumstances
- The TAXI project demonstrates that things can be re-used and adapted, not just buildings, but also parking lots and construction materials
- A part of TAXI's success had been because they found an economic niche they could cater to the success of TAXI spurred action in the area by other developers



The TAXI project is an incremental development that will have five total phases: phase 1 was the conversion of the Yellow Cab terminal and phase 2 onward will be new construction. The design style is intended to be gritty and work with the look of the surrounding industrial area

A before and after image of the TAXI building: the design utilized the loading bay to create office and meeting space that allows the outdoors in by "rolling up" the windows that fill the bay doorways

A lunch gathering at the outdoor courtyard between the buildings: dubbed "FR8scape" by the designers, the courtyard exemplifies sustainable practices by removing asphalt to make room for native grasses and trees. to allow stormwater infiltration. Food vendors fill the space at lunch as the employees from the surrounding office spaces have a place to gather

Residents meet out a night for eating at the local restaurant Fuel: here they dine on fresh, local, organic food that is served to them on the outdoor patio. The restaurant grows some of its organic food in garden space located adjacent to the restaurant

CASE STUDY 4: ESPANA LIBRARY PARK IN MEDELLIN, COLOMBIA

TIMELINE

1930s Medellin established a legacy of modernist architecture

2003 Prior to and in 2003, crime in the Santo Domingo neighborhood was so bad that no one was allowed on the streets after 5 pm and area was controlled by urban militias

2004 The Integral Urban Project is organized as a city initiative to improve infrastructure in poor zones of the city; five library parks are planned to be constructed, including the España Library

2005 Design of the library begins

2006 Construction begins

2007 Construction is finished and the library is opened

2011 Due to the successes and impacts of the first five library parks, plans for five more are added to the Integral Urban Project

The España Library in Medellin, Colombia is an iconic public library park that was constructed in a previously neglected and crime-ridden part of the city to signify and catalyze social and economic change.

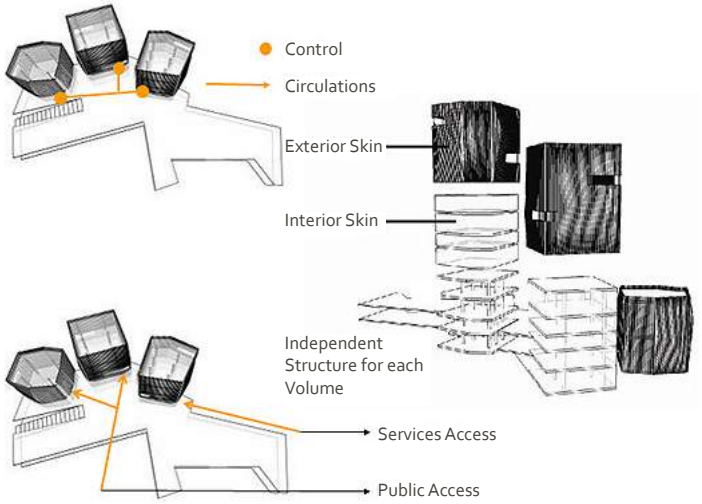
The program for the España Library asked for a building with library, training room, administration room and auditorium on a unique volume. It was proposed that the program be fragmented into three groups which would then be joined through a platform on the bottom. The library, rooms, and the auditorium then could each operate independently and enjoy flexibility and autonomy while technically being under one roof. The splitting of the volumes has been carried out with form and materials that are an interpretation of Medellin's geography and fit well into the landscape.

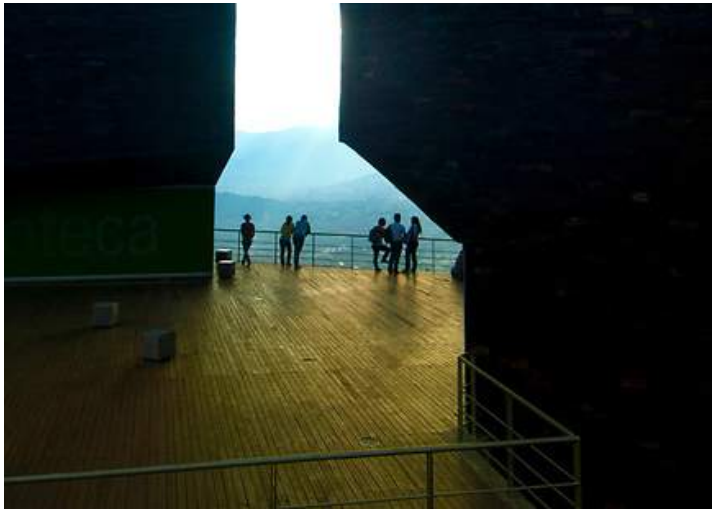
Leaders in Medellin embrace the philosophy that public architecture and new public spaces can create social and economic benefits. By locating the iconic structures on one of the hillsides where Medellin's drug traffic network has perpetuated violence since the 80's, the government is signifying to the people in that area that they too are a part of the cities legacy, fostering a sense of civic pride, identity, and ownership that the community and its citizens benefit from. Crime in the area has gone down and education has improved dramatically.

Medellin's leaders have implemented long-term, community-based policies of urban renewal, acknowledging that libraries, education, culture, safety, and public spaces have mutual beneficial impacts on each other and their communities. A series of smart, public minded policies and actions have helped to create a culture for forward-thinking and big ideas.

KEY MESSAGES

- The building was successfully broken into three separate, but interconnected volumes
- Thoughtful integration of outdoor public space has made positive impacts in the surrounding community
- Iconic architecture can pay tribute to local geography, history, or other influences and make a lasting impression to outsiders or passersby
- Memorable community facilities have fostered a sense of civic identity and ownership among the citizenry
- Big-idea projects can catalyze and/or sustain a forward thinking culture among citizens and leaders alike





A diagram of the design scheme: A strong architectural form was executed without sacrificing function

The spaces between the buildings are connected by a platform: The plan shows the connection of the three buildings by a platform at the lower level. The platform also serves as an outdoor square that overlooks the valley and serves as a meeting place

The architectural style is a modernist tribute to geography: The form of the library was intended to be integrated into the landscape and become an interpretation of it

The new buildings now provide quality public space: Emphasis on good outdoor space extends the building's presence beyond its walls and into the surrounding neighborhood

CASE STUDY 5: REDEVELOPMENT DOWNTOWN WALNUT CREEK

Downtown Walnut Creek, California showcases incremental redevelopment in a city center. The downtown district began to see decline in the late 1970's and 1980's. Small businesses were struggling and closing. Customers were shopping in neighboring cities with more appealing shopping options. The downtown economy was becoming sluggish and fading. The automobile had long dominated the downtown core since the 1950's, resulting in a disconnected and pedestrian hostile center with no connectivity.

In an effort to remedy the aesthetic and economic problems of the city's downtown center, the city leaders led an initiative along with local business owners to begin the redevelopment process. Some redevelopment efforts are made with one developer and occur rather quickly and uniformly. However, in the case of Walnut Creek, the redevelopment of the downtown area has progressed over the last twenty years and continues with such future projects as the Downtown West project. The city began by identifying significant properties for infill development. The city created a vision for the area and then adopted general policies to govern the overall area as it reemerged.

There was a strong focus on the importance of pedestrian connectivity through a series of promenades, plazas and courtyards. These spaces, ranging from a large plaza to small tree lined corridors, all worked together to allow pedestrians to move throughout the downtown area. There is a diverse mix of building and architectural styles, while still managing to maintain a visual resonance with the overall appearance of the city. The city has also taken advantage of the proximity to the Bay Area Rapid Transit. The downtown offers a bus disguised as a vintage trolley-car that offers free service from the BART station to the downtown area. Thanks to the redevelopment efforts, the downtown area is ranked as one of the top 10 "Main Street" retail areas in the country. Likewise, it has become the principle gathering place and hub of activity for the citizens of Walnut Creek.

TIMELINE

1951 The Broadway Shopping Center opened and was the first major retail center in the county. Tax sales grew as did the population which grew from 2,460 to 9,903 ten years later

1956 A small master plan is created in an effort to improve downtown streets

1970's-1980's The downtown area experienced decline as small businesses struggled to survive. The historic downtown experienced a disconnect to Broadway Plaza. Parking difficulties likewise hampered the area.

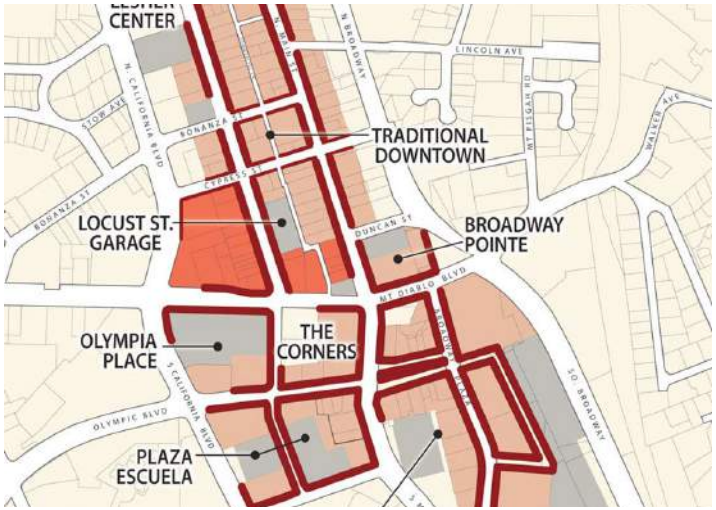
1989 The Walnut Creek Downtown Business Association began plans to revitalize the downtown core, bring in business, and improve the overall look of the area. A General Plan begins to lay out the plans for future growth and development

1990's Incrementally the downtown began to be reshaped. Broadway plaza is revitalized and pedestrian connecting corridors are created

2000's Space by space plans continue to be developed as the entire area is redeveloped and linked both north and south of the historic center

KEY MESSAGES

- Incremental redevelopment can have a big impact on downtown improvement
- Pedestrian connectivity is a vital part of the urban fabric
- Street trees should be utilized and planted tightly to improve aesthetics as well a temperature control
- The city should take an active and vital role in reshaping the city; good planning and strong initiative is essential for a successful redevelopment strategy
- Public gathering spaces lend to community identity and improve the quality of the downtown core



Specific Area Plans were created incrementally: this image shows the plan for Locust Street. The red surrounding the streets shows the extent of retail frontage that in downtown. Other Specific Area Plans have included Broadway Plaza, Plaza Escuela and Olympia Place

A free shuttle service moves past a downtown plaza: the shuttle is dressed up to appear as a trolley car. The city provides the service to bring BART travelers into the downtown area

Redevelopment continues today as new plans are developed for Broadway Plaza: the hope is to continue creating more mixed-use and higher-density development

Tree lined pedestrian corridors are a major factor to the improving quality of downtown: by providing these connections, Walnut Creek became accessible by foot and helped to lessen the onerous parking problems of the area

CASE STUDY 6: TRANSIT ORIENTED DEVELOPMENT FRUITVALE VILLAGE

TIMELINE

1991 A proposal is created to build a multi-level parking facility at the Fruitvale station. The plan is met with community opposition

1992 The Community Development Block Grant funded $185,000 to develop an alternative plan

1993 An additional $470,000 is granted by the Federal Transit Administration to further a plan for the area

1994 The Fruitvale BART Transit Village Policy Committee is formed

1996 The city passes a zoning ordinance creating a new transit village zone which allows for higher density and mixed-use development

1999 BART receives $7.65 million from the FTA to build a replacement parking structure and the Transit Village project begins

2003 Project nears completion and residents begin to occupy the apartments

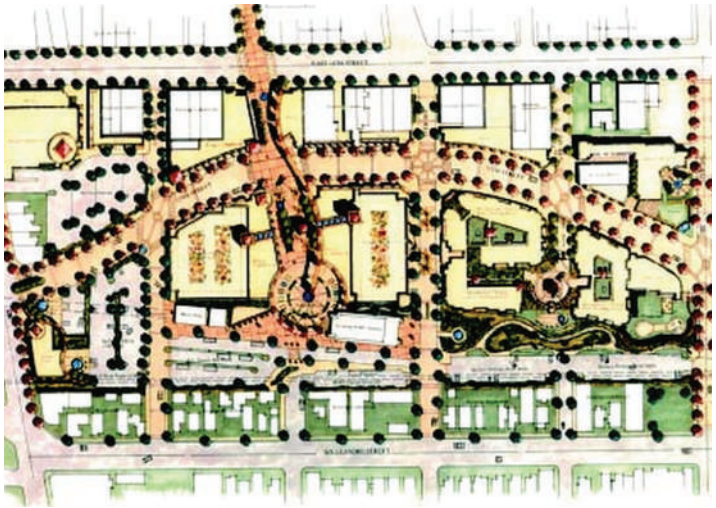
The Fruitvale Transit Village and Transit Oriented Development (TOD) in Oakland, California is a project that stemmed from a broad-based partnership among public, private, and nonprofit organizations that worked together to revitalize a blighted area and a struggling community.

The Fruitvale Station was The Unity Council's, a community development organization, idea that was brought to light when Bay Area Rapid Transit (BART) revealed plans to construct a multi-level parking structure adjacent to the BART station. The Unity Council motivated neighborhood opposition to the parking structure design and its location, arguing that any development around the BART station should be guided by a broad-based community planning process where all members of the community would be involved. With the community joining forces with the Unity Council, BART withdrew its plans for building the parking structure, and agreed to work with the community on a new plan for the site.

In the years, that followed the Unity Council engaged local stakeholders in many comprehensive visioning and planning exercises that laid of the framework for what the Fruitvale Transit TOD would become. The Fruitvale Transit Village and Station represent a creative and innovative approach for using mass transit to galvanize and to act as a catalyst for revitalizing a suburban community. This project is an exploratory project that is still talked about in many planning and design circles around the nation.

KEY MESSAGES

- It promoted fruitful infill development
- It was a comprehensive plan with good design standards
- It catered to the local population by providing vital amenities adjacently located to a major transit hub
- Has set a precedent for TOD developments around the world



An illustrative plan of the Fruitvale Village: goal's of the project included beautification of a blighted areas while also providing physical, economic and social revitalization to the surrounding neighborhood

Housing sits upon the station's primary retail artery: the village includes 47 units of mixed income housing and 40,000 square feet of neighborhood retail shops and restaurants

The transit village was built on former BART parking lots: the development then created a large parking structure for the BART as well as a 150 car parking garage within the buildings

The pedestrian plaza uses colorful paving and art to create a vibrant space: large palm trees and a fountain help to provide a comfortable space for the residents and visitors to the village

CASE STUDY 7: TRANSIT ORIENTED DEVELOPMENT ROSSLYN-BALLSTON METRO CORRIDOR

TIMELINE

1980's In an effort to improve a declining low-density commercial corridor, local government planners began a long range plan to focus development on five closely spaced rail stations

1980's A general land use plan is developed which sets the guidelines for development to focus higher density around the planned stations

1990's Growth of the "urban villages" continued successfully and several TOD communities emerged from the project

2005 The county implemented an affordable housing ordinance

2014 The total office space in the county doubled to more than 50 million square feet. The county boasts the highest population density of any county in Virginia

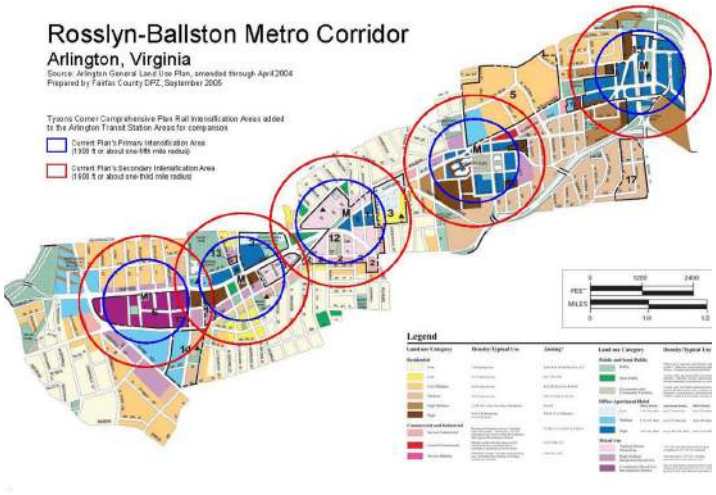
The Arlington County Transit Oriented Development (TOD) is one of the country's most successful examples of how government can incentivize private development to build in a way that concentrates density where it is needed, encourages more aesthetically pleasing design, and creates an environment that is more pedestrian friendly. Implementing this process was not easy and required foresight and dedicated planning to pull off.

In the 1960s and 1970s, county leaders saw that the commercial center of the county had become dilapidated and had fallen into a state of disrepair. Businesses were fleeing the region, and shoppers were choosing to shop at other destinations. While there were plans for a new metro subway line to pass through the area, the alignment followed the median of a future freeway. County leaders had the idea to lobby the transit agency to have the route changed to pass under the old commercial center. This alignment would allow for transit to become the catalyst for new development.

County leaders knew that simply relocating the subway would not be enough to encourage the kind of development they wanted. They wanted high density development that reduced car use and encouraged people to take transit. The solution created for this goal was a community led approach that focused on development around the 5 metro stations that would be located in the region. A general land use plan was created with 4 keystone policies to preserve established single family residential areas surrounding the stations, target development to a ¼ to ½ mile radius around stations, build a strong tax base, and encourage a mix of uses. Sector plans were created for each of the 5 areas, which provided guidelines as to how the development would look. In order to have greater control over each proposed development, the county kept the as-of-right zoning to a relatively low density. This gave the county some leverage in the development process. If developers wanted to build a high density development, they had to ask the county for a variance. The county in turn could then negotiate for pedestrian amenities or quality design aspects from the developer in order for them to receive the variance. Overall, the system has been a huge success in developing a previously deteriorating area into one that is vibrant and exciting.

KEY MESSAGES

- Transit stations can provide the catalyst needed for redevelopment to occur
- A clear and consistent planning policy framework is important in order to prevent unnecessary resistance and help developers understand what they can and cannot develop
- Broad public education and participation in the redevelopment process is essential and must be maintained over time



The original 5 station development plan: each sector had a individual plan that specified use and zoning ordinances, urban design, transportation and open-space guidelines. Later provisions added mixed-use development and a heavier emphasis on urban design

A specific area plan allows for individual identity and development types for each sector: this illustrative plan was created in 2006 for the Clarendon Sector Plan. The planning process developed over a long period of time, with origins for this plan beginning back in 1984

The market commons features outdoor eating and fountains: the area hosts regular community events. The development model allows for a prevalence of small businesses that contribute to a strong sense of community in the area

A plaza space at Shirlington: this development in the TOD corridor follows the New Urbanist model. The unincorporated area is largely mixed-use development and has been dubbed "Arlington's Art and Entertainment District"

CASE STUDY 8: REDEVELOPMENT FALSE CREEK NORTH

TIMELINE

1950's The area had served as the industrial center for Vancouver, but as the industries began to shift locations, the areas around False Creek began to deteriorate

1960's A plan was pushed through to run freeways through the city. A citizens group formed opposing the freeway and changed how land use decisions were made

1980's The first of the projects began to take shape starting with North Shore of False Creek. The redevelopment showcases livable high-density housing

1991 The Official Development Plan is set out and enables new higher density development and improvements to public amenities including streetfront shops, parks, and community centers

The False Creek North project is one of three major developments in the False Creek district of Vancouver, British Columbia: False Creek South, False Creek North, and False Creek Southeast.

After the relocation of the core industry from the area, the city began to decline and officials needed to find a solution to revitalize this area, thus, the False Creek Development was created. Because the success of the first project, False Creek South, the city government proceeded with the second development, False Creek North. This has been a bench-mark project in waterfront development all around the world.

The False Creek area is now a mix of eclectic and vibrant neighborhoods. Architecture and urban design were major influences in creating the distinct characteristics of each district.

A major accomplishment for the area was the initiative by active citizens groups that helped prevent multiple freeways from entering the city. Participation of active citizens groups resulted from anger over the closed-door freeway development plan previously used in the city planning. The result was a more informed, engaged, and participatory process resulting in greater citizen involvement in the development.

KEY MESSAGES

- Make the design and decision making process public oriented
- Utilize view-sheds and natural resources
- Higher density housing allows for preservation of open space and creates more homes for high demand areas
- Focus on good connections for pedestrians and cyclists, don't design for the car

An illustrative plan shows the development at North False Creek: the project took what was once a heavily industrialized area and turned it into attractive shoreline living that features large greenspace, beach access and high-end residential housing

High rise residential buildings line the skyline of North False Creek: despite the large buildings, the views to the water are still maintained from the streets and public access is given precedence

A sunbather enjoys the sunny weather at George Wainborn Park: the large park allows for impressive views of False Creek. The park opened in 2005 and cost $5.1 million and is valued by locals, especially dog owners, who have a large space for their animals to run in

CASE STUDY 9: REDEVELOPMENT THE PEARL DISTRICT

TIMELINE

Late 1800's The area was a neighborhood of single family homes, divided into upper class in the upper quadrant and working class in the lower quadrant

1905 A surge of growth resulted in an expansion of the railway and the neighborhood was gradually converted over to mostly commercial and industrial uses

1970's The rail yards began to decline and factories began to close. The district began to decay

1990's After years of toying with the idea of redevelopment and making small changes, the new Pearl District began to take shape

2001 The Pearl District development plan is created. Old industrial buildings are re-purposed, streets are landscaped and a streetcar is installed

Present The Pearl District is now one of the most trendy and upscale neighborhoods in Portland

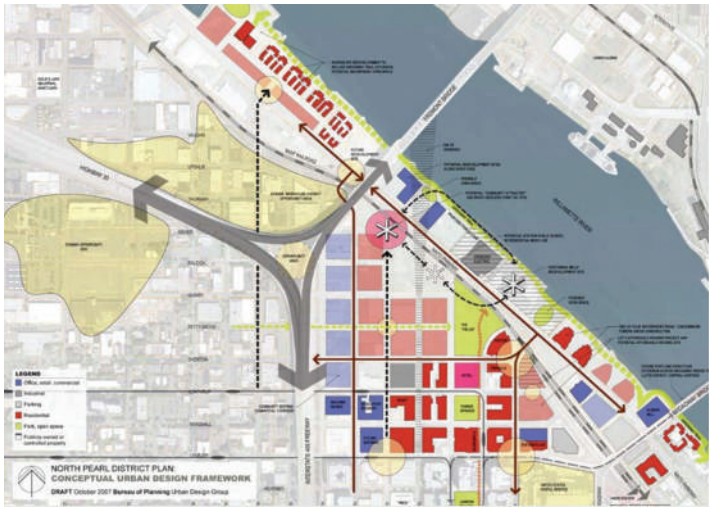
The Pearl District of Portland, Oregon exemplifies the possibilities of catalyzing redevelopment via transit. Once a hub of distribution and industrial uses the area of northwest Portland between Interstate 405, Broadway, and Burnside, known as the Pearl District, suffered from decades of underinvestment.

The Urban Renewal planning entities in the City of Portland and Multnomah County highlighted the district for redevelopment in the mid-1990's. Private developers also saw the potential of the area. Together, they planned the return of the streetcar to Portland city streets. The new line opened in 2001, linking the Pearl District through downtown Portland to the completely new South Waterfront development. The next decade saw over four billion dollars of private investment in the Pearl District and throughout downtown Portland.

Spurred on by the public investment in transit and streetscape along the route, developers added and adapted thousands of housing, retail, and office units. The public-private partnership went beyond dollars, zoning, and tax incentives to include planning for whole communities—the daily services and activities that people need and enjoy in their neighborhoods. As such, the Pearl District features everything from a variety of housing to multi-modal transit options, offices, artist galleries, eateries, breweries, theaters, parks, public art, and a diversity of businesses.

KEY MESSAGES

- Adaptive re-use can be a very efficient and sustainable means to revitalize areas
- Mass transit improvements can act as economic and social energizers
- Municipalities can make the first move in redevelopment to signal sincerity
- Provide "whole community" services when revitalizing an area



A concept plan for The Pearl District: improvements to the area included improved transit, better streetscape, greenspace, housing, restaurants and retail amenities

The streets of The Pearl District thrive with an outdoor cafe: outdoor dining enlivens the street and dining options easily accessed thanks to close proximity to the Portland Streetcar

Tanner Springs Park is an urban park that was built as part of the Pearl District redevelopment: not wanting to conflict with the nearby Jamison Square, Tanner Springs was designed to be a quiet, naturalist park that provided a serene location for residents to enjoy as respite from busy city life

Children and adults enjoy the fountain at Jamison Square: as part of the redevelopment of the Pearl District this park was installed. The park's most popular feature, the water, was only added as an afterthought as a means to prevent skateboarders from using the rock structures

BIBLIOGRAPHY

American Association of State Highway and Transportation Officials (AASHTO). 2011. Policy on the Geometric Design of Highways and Streets, 6th Edition. Washington DC: AASHTO.

Cervero, Robert and Erick Guerra. 2011. Urban Densities and Transit: A Multi-dimensional Perspective. Working Paper Series. UCB-ITS-VWP-2011-6. Berkeley, CA: Institute of Transportation Studies. September 2011.

Institute of Transportation Engineers. 2006. Context Sensitive Solutions for Designing Major Urban Thoroughfares for Walkable Communities. ITE RP-036.

Larice, Michael and Elizabeth Macdonald, editors. 2012. The Urban Design Reader, 2nd Edition. London, UK: Routledge, .

Scheer, Brenda and Michael Larice. 2013. A Classification and Analysis of Urban and Suburban Arterial Development: Toward an Understanding of the Strip. Paper delivered at the International Study of Urban Form conference in Delft, Netherlands. Forthcoming in Published Conference Proceeedings.

Szczepanski,Carolyn. 2013. How Bicycles Bring Business. momentummag.com April 29, 2013.

Shoupe, Donald. 2011. Putting the Cost of Free Parking in Perspective. In: The High Cost of Free Parking (2nd Ed.) Chicago: American Planning Association.

IMAGE + PHOTO CREDITS

CHAPTER 2 EXISTING CONDITIONS + SITE CONTEXT

Page 12
Photo top left corner: http://farm7.staticflickr.com/6195/6094652705_bfc0e6e40a_o.jpg

Page 13
Top left: Tam Guy
Photo top right: http://upload.wikimedia.org/wikipedia/commons/6/68/United_Streetcar_10T3_prototype_for_Portland.jpg
Photo bottom left: Google Maps
Photo bottom right: Melissa Fryer

Page 14
Photo top: http://kwalliance.org/wp-content/uploads/2013/01/high-point-012.jpg
Image bottom: http://www.conservation.ca.gov/cgs/information/kids_geozone/PublishingImages/liquefaction1.jpg

Page 15
Image top: Tam Guy
Image bottom: Melissa Fryer

Page 16
Image right: Tam Guy

Page 17
Image top: Tam Guy
Image bottom: Tam Guy

Page 18
Image bottom: Amanda Roman + Melissa Fryer

Page 19
Image: Melissa Fryer
Photo top: Jack Robinson
Photo bottom: Jack Robinson

Page 20
Photo top: Jack Robinson
Photo bottom: Jack Robinson
Image: Melissa Fryer

Page 21
Image: Melissa Fryer
Photo top: Jack Robinson
Photo bottom: Jack Robinson

Page 22
Photo top: Melissa Fryer
Photo bottom: Melissa Fryer

Page 23
All Images: Melissa Fryer

Page 24 **Image top:** http://www.pge.com/includes/images/mybusiness/customerservice/otherrequests/treetrimming/tree/treetrimpruningpractice450px.jpg

Page 25 **Image top:** Amanda Roman + Melissa Fryer
Image bottom: Amanda Roman + Melissa Fryer

Page 26 **Image top:** http://d3j6kov2ek5gfa.cloudfront.net/sites/default/files/content-photos/Euclidean%20(300px-height).png
Image bottom: http://theblueereview.org/wp-content/uploads/2012/12/vertical-diversity.png
Photos center: Kevin Gardiner + Toliy Whiting

Page 27 **All images:** Kevin Gardiner + Toliy Whiting

Page 28 **Photo top:** Google Maps
Photo bottom: Google Maps
Image: Kevin Gardiner + Toliy Whiting

Page 29 **Image center:** Kevin Gardiner + Toliy Whiting
Image top right: http://www.onepaseo.com/lib/img/renderings/renderings02.jpg
Image bottom right: http://bettercities.net/sites/default/files/hicksville2.jpg

Page 30 **Image top:** http://momentummag.com/downloads/7775/download/M60_FEAT_BikeBiz_Infographic.png
Photo bottom: http://bloximages.chicago2.vip.townnews.com/voiceofoc.org/content/tncms/assets/v3/editorial/a/73/a7308c86-83e3-11e3-97b1-2963f4/52e0956c0569c.image.jpg

Page 31 **All images:** Kevin Leo

Page 32 **Image top:** http://www.aecom.com/What+We+Do/Design+and+Planning/Market+Sectors/Transportation/Small+Area+Plans/_projectsList/Monrovia+General+Plan+and+Transit+ Oriented + Development +(TOD)
Image bottom: http://www.aecom.com/deployedfiles/Intranet/Business%20Lines/Planning,%20Design%20&%20Development/Images_MacArthur/Monrovia%20General%20Plan.jpg

Page 33 **All images:** Kevin Leo

Page 34 **Image:** http://densityarchitecture.wordpress.com/category/study/

Page 35 **Top image:** Gerrard Allam
Bottom Image: http://www.scotland.gov.uk/Resource/Img/258568/0074627.jpg

Page 36 **Image:** Krier, L. (2009). *The architecture of community*. Washington, DC: Island Press. Page 28

Page 37 **Top image:** Gerrard Allam + Kyongrok Kim
Bottom image: http://www.ite.org/css/online/DWUT04.html

Page 38 **All photos:** Gerrard Allam + Kyongrok Kim

CHAPTER 3 VISIONING AND PRINCIPLES FOR COTTONWOOD HEIGHTS

Page 39 **Photo:** Jack Robinson

Page 40 **Image:** http://www.urbanstrategies.com/project/london-ontario-transportation-master-plan/

Page 41 **Image:** http://www.urbanstrategies.com/project/london-ontario-transportation-master-plan/

Page 42 **Image:** Kevin Gardiner

CHAPTER 4 PROPOSALS FOR TRANSIT + PUBLIC REALM IMPROVEMENTS

Page 61 **Photo:** http://dearestdistrict5.blogspot.com/2011/05/octavia-boulevard-hell-on-earth.html

Page 62 **Photo:** http://upload.wikimedia.org/wikipedia/commons/6/6d/Avenue_des_Champs-%C3%89lys%C3%A9es_July_24,_2009_N1.jpg

Page 63 **Top photo:** http://www.metroplanning.org/news-events/blog-post/6477
Bottom photo: http://gehlarchitects.files.wordpress.com/2010/11/4370520506_7e7b7dfb34_b.jpg

Page 64 **Top photo:** http://michaelahillen.files.wordpress.com/2010/11/october-21-011.jpg
Bottom photo: http://whoistampabay.com/ilovethisplace/wp-content/uploads/2013/03/Tampa-Street-Car.jpg

Page 65 **Top photo:** http://4.bp.blogspot.com/-PUU6eLO51oM/Um7udh2qTeI/AAAAAAAAEwk/Xu2cN8z9M4I/s1600/tram06.JPG
Bottom photo: http://ak2.picdn.net/shutterstock/videos/3944399/preview/stock-footage-sheffield-uk-july-an-tram-making-its-way-through-the-city-centre-of-sheffield.jpg

Page 66 **All photos:** http://www.metrojacksonville.com/article/2011-oct-norfolk-tide-exceeds-ridership-estimates

Page 67 **Top photo:** http://triptotheouthouse.files.wordpress.com/2009/07/metrorail-houston.jpg
Bottom photo: http://unews.utah.edu/wp-content/uploads/TRAX-credit-Utah-Office-of-Tourism.jpg

Page 68 **Image:** Melissa Fryer using graphic images from: Apartment by Adam Iscrupe from The Noun Project, Bike Messenger by Luis Prado from The Noun Project, City by Juan Pablo Bravo from The Noun Project, Building by Kat Tp from The Noun Project, House by Lil Squid from The Noun Project, Building by Claire Jones from The Noun Project, Children on Leashes by Cards Against Humanity from The Noun Project, http://www.cscc.edu/update/images2/ Tree Graphic.gif

Page 69 **Image:** http://3kpnuxym9k04c8ilz2quku1czd.wpengine.netdna-cdn.com/wp-content/uploads/2013/08/bus-streetcar-lrt.png

Page 70 **Top image:** http://www.acgov.org/cda/successor/projects/cvsp/images/aerialperspective_large.jpg
Bottom image: http://4.bp.blogspot.com/-_i8Evff644E/T-PKxo2wq0I/AAAAAAAAAPY/prjhPk_2bn8/s1600/grt2ndst_cycle_track_render.jpg

Page 71 **Top image:** http://www.blogto.com/upload/2012/01/20120119-Urban%20Manual-Sidewalk.jpg
Bottom photo: http://landscapeonline.com/research/article/16782

Page 72 **Image:** Gerrard Allam + Amanda Roman

Page 73 **Image:** Gerrard Allam + Amanda Roman

Page 74 **Image:** http://www.ldschurchnews.com/media/photos/2009/38918-m.jpg

Page 75 **Center image:** http://www.ci.springfield.or.us/tigergrant/springfield.html
Top photo: http://www.atreeaday.com/atreeaday/Gleditsia_triacanthos_files/shapeimage_1.png
Bottom photo: http://localecologist.blogspot.com/2011_12_01_archive.html

Page 76 **Image:** Kevin Gardiner + Kevin Leo

Page 77 **Image:** Kevin Gardiner + Kevin Leo

Page 78 **Top image:** http://www.streetsblog.org/wp-content/uploads/2011/02/PikeMonroe1.jpg
Bottom photo: http://brighamyen.com/2013/11/12/lessons-urbanism-chicago-brigham-yen-joins-architect-thomas-coxs-uli-panel/

Page 79 **Image:** Melissa Fryer

Page 80 **Image:** Melissa Fryer

Page 81 **Image:** Melissa Fryer

Page 82 **Top photo:** http://www.cleanwaternashville.org/content/greeninfrastructure/images/galleries/existing-gi/img_03.jpg
Bottom photo: http://www.azwater.gov/azdwr/WaterManagement/AMAs/TucsonAMA/images/2006StarValleyMedians4_large.jpg

Page 83 **Image:** Kyongrok Kim

Page 84 **Image:** Kyongrok Kim

Page 85 **Top photo:** http://ttmg.org/blog/wp-content/uploads/2012/05/Off-Board-Fare-Collection.jpg
Bottom photo: http://img.deseretnews.com/images/article/midres/700328559/700328559.jpg

Page 86 **Photo:** http://upload.wikimedia.org/wikipedia/commons/e/e7/Curitiba_Centro.jpg

Page 87 **Center image:** http://www.thetransportpolitic.com/wp-content/uploads/2010/04/Rendering-of-BRT-in-Berkeley.png
Top photo: http://www.amtrakdowneaster.com/sites/default/files/imagecache/sc_815x310/Slide-Portland-Holiday-LIghts.jpg
Center photo: http://www.slcdocs.com/arts/SLC_publicart/images/transit/lenka-konopasekold-greektown-station3.jpg
Bottom photo: http://images.travelpod.com/tripwow/photos/ta-009b-0ebc-cbe2/public-art-seattle-united-states+1152_12818883205-tpfil02aw-793.jpg

Page 88 **Image:** Kevin Gardiner + Kevin Leo

Page 89 **Image:** Kevin Gardiner + Kevin Leo

Page 90 **Top photo:** http://i1361.photobucket.com/albums/r674/SEFTAlt/HoustonMETRORail3_zpsa8a82ab7.jpg
Bottom photo: http://aslathedirt.files.wordpress.com/2012/04/lightrail.jpg

Page 91 **Photo:** http://www.asla.org/2011awards/images/largescale/091_07.jpg

Page 92 **Image:** Colin Olsen + Anatoliy Whiting

Page 93 **Image:** Colin Olsen + Anatoliy Whiting

Page 94 **Image:** Colin Olsen + Anatoliy Whiting

Page 95 **Image:** Colin Olsen + Anatoliy Whiting

Page 96 **Top photo:** http://media.oregonlive.com/commuting/photo/091-09jpg-aecb2a65313bba69.jpg
Bottom photo: http://southendclt.files.wordpress.com/2013/07/bike-share-bland-station.jpg

Page 97 **Images:** Tam Guy

Page 98 **Images:** Tam Guy

Page 99 **Image:** Tam Guy

Page 100 **Top image:** http://places.designobserver.com/media/images/chakrabarti-hyperdensity-4-zoom.jpg
Bottom image (extending to next page): http://places.designobserver.com/media/images/chakrabarti-hyperdensity-2-zoom.jpg

Page 101 **Top image:** http://www.mto.gov.on.ca/english/transit/supportive-guideline/creating-transit-supportive.shtml

Page 102 **All images:** http://www.its.berkeley.edu/publications/UCB/2011/VWP/UCB-ITS-VWP-2011-6.pdf

CHAPTER 5 PROPOSALS FOR CATALYTIC PROJECTS

Page 104 **All images:** http://www.southernenvironment.org/cases/smart_growth_in_southeast/

Page 105 **Images:** Kevin Gardiner

Page 106 **Image:** Kevin Gardiner + Tam Guy + Gerrard Allam

Page 107 **Image:** Kevin Gardiner + Tam Guy + Gerrard Allam

Page 108 **All images:** Kevin Gardiner + Tam Guy + Gerrard Allam

Page 109 **All images:** Kevin Gardiner + Tam Guy + Gerrard Allam

Page 110 **All images:** Kevin Gardiner + Tam Guy + Gerrard Allam

Page 111 **All images:** Kevin Gardiner + Tam Guy + Gerrard Allam

Page 112 **Top image:** http://www.perkinswill.com/sites/default/files/project-imagery/MarineGateway_main3.jpg
Bottom image: http://m1.behance.net/rendition/modules/73358363/hd/d713696e3d818509043436d3dcde3622.jpg

Page 113 **Image:** Melissa Fryer

Page 114 **All images:** Melissa Fryer, utilizing the following graphic sources: Space Shuttle by Rafaël Massé from The Noun Project School by Chris Cole from The Noun Project, Car by Josue Oquendo from The Noun Project

Page 115 **All images:** Melissa Fryer

Page 116 **Image:** Amanda Roman + Kevin Leo + Melissa Fryer

Page 117 **Image:** Amanda Roman + Kevin Leo + Melissa Fryer

Page 118 **Left image:** Amanda Roman

Right image: Kevin Leo

Page 119

Bottom images: Kevin Leo
Photo set:http://www.socketsite.com/archives/2007/11/copper_clad_and_coming_semisoon_at_17th_and_clayton.html
http://www.lindumgreenroofs.co.uk/userfiles/Image/Sedum_007_small-web(1).jpg
http://www.claffisica.org/wp-content/uploads/2014/01/Red-Color-Applied-in-BONAMPAK-77-Exterior-Design-Finished-with-Best-Lighting-Unit-Decorating-Idea-with-Wooden-Wall-Panel-Plan-324x150.jpg
http://cdn.c.photoshelter.com/img-get/I0000_lvM51vyJjI/s/750/750/0509231-golden-aspens.jpg
http://www.dailytonic.com/wp-content/uploads/2009/11/sanaksenaho-ecumenical-art-chapel14-1.jpg
http://www.mygardeninsider.com/uploads/2011/10/5266_1.jpg
http://www.travelimages.com/PERedRockAutumn/Yucca.jpg
http://laud8.files.wordpress.com/2011/04/laud8-confetti2.jpg

Page 120

Top image: http://ad009cdnb.archdaily.net/wp-content/uploads/2013/02/512e58e7b3fc4b72a80002bd_uli-announces-finalist-teams-for-2013-student-urban-design-competition_3-528x343.jpg
Photo left: http://s1.ibtimes.com/sites/www.ibtimes.com/files/styles/v2_article_large/public/2011/12/10/202975-urban-umbrella.jpg

Page 121

All images: Kyongrok Kim + Colin Olsen + Anatoliy Whiting

Page 122

Image: Kyongrok Kim + Colin Olsen + Anatoliy Whiting

Page 123

Image: Kyongrok Kim + Colin Olsen + Anatoliy Whiting

Page 124

Image: Kyongrok Kim + Colin Olsen + Anatoliy Whiting

Page 126

All images: Kyongrok Kim + Colin Olsen + Anatoliy Whiting

Page 127

All images: Kyongrok Kim + Colin Olsen + Anatoliy Whiting

Page 128

All images: Kyongrok Kim + Colin Olsen + Anatoliy Whiting

Page 129

All images: Kyongrok Kim + Colin Olsen + Anatoliy Whiting

Page 130

All images: Kyongrok Kim + Colin Olsen + Anatoliy Whiting

CHAPTER 7 APPENDIX A CASE STUDIES IN TRANSIT ALTERNATIVES

Page 137

Section: http://hayesvalleysf.org/html/archives/2005/2005_05-06/2005-05-15_breakfast.html
Bottom photo: http://www.restreets.org/case-studies/octavia-boulevard
Bottom image: *Draft for Public Review: Market and Octavia neighborhood plan*. San Fransico Planning Deptartment for Better Neighborhoods. 2002

Page 139
Section: http://www.uctc.net/papers/354.pdf
Bottom image: http://www.uctc.net/papers/354.pdf
Bottom photo: http://www.friendsofoceanparkway.org/p/scrapbook.html

Page 141
Section: http://tcat.ca/sites/all/files/CSxD_WebSpreadsMay2012.pdf
Bottom left photo: http://torontoist.com/2011/11/meet-your-new-streetcars-toronto/20111104ttc1/
Bottom right photo: http://janemalyon.com/wp-content/uploads/2009/09/Street-Cars-in-Toronto-by-Jane-Malyon.jpg

Page 143
Section: Melissa Fryer
Bottom left photo: http://25.media.tumblr.com/6daf5aa9750ece56d7aaa78cc2e94da9/tumblr_mtljixsXpM1r54c4oo1_1280.jpg
Bottom right photo: http://www.pdx.edu/oaa/sites/www.pdx.edu.oaa/files/styles/pdx_school_home/public/StreetcarPlaza.jpg

Page 145
Section: Melissa Fryer
Bottom left photo: Google Earth
Bottom right photo: http://nahverkehr-deutschland.startbilder.de/bilder/flexity-auf-m2-berlin-juli-26397.jpg

Page 147
Section: Melissa Fryer
Bottom left photo: http://www.compassblueprint.org/Documents/METRO_Orange_Line_Corridor_Plan-Desiree_Portillo-Rabinov.pdf
Bottom right photo: http://www.metro.net/

Page 149
Section: Toliy Whiting
Bottom image: http://sf.streetsblog.org/2012/06/27/options-for-geary-brt-come-into-focus/
Bottom photo: http://gehlarchitects.files.wordpress.com/2010/11/4370520506_7e7b7dfb34_b.jpg

Page 151
Section: Melissa Fryer
Bottom left photo: http://www.bmsdesigngroup.com/i/transport-thirdstreet.jpg
Bottom right photo: https://missionlocal.org/2010/04/the-risks-of-riding-munis-third-street-line/

Page 153
Section: Colin Olsen
Bottom image: Urban Design Manual-North Temple Boulevard-Transit Corridor pg 56.jpg
Bottom photo: Lance Tyrrell

CHAPTER 8 APPENDIX B CASE STUDIES IN TRANSIT-ORIENTED DEVELOPMENT

Page 155
Top image: http://www.moneyteachers.org/LDS+Church+Construction+Project.html
Top photo: http://americanbuildersquarterly.com/site/wp-content/uploads/2012/04/City-Creek-project-looking-southeast-Sept-2011_i6c00521.jpg
Bottom left photo: http://rationalfaiths.com/wp-content/uploads/2013/06/City5_0.jpg
Bottom right photo: http://www.forumfortnightly.com/wp-content/uploads/2012/10/Feature_City-Creek-2.jpg

Page 157
Top image: http://www.swagroup.com/project/santana-row.html

Bottom left photo: http://www.swagroup.com/project/santana-row.html
Bottom right photo: http://www.wicfy.com/images/markets/original/Santana_Row_44193400_1390569302_355.jpg

Page 159
Top image: https://www.facebook.com/taxicommunity?ref=br_rs
Top photo: https://www.facebook.com/taxicommunity?ref=br_rs
Bottom left photo: http://inhabitat.com/fr8scape-former-freight-yard-transformed-into-green-gathering-space-in-denver/
Bottom right photo: http://www.lreecephotography.com/fuel-cafe/

Page 161
Top image: http://ad009cdnb.archdaily.net/wp-content/uploads/2008/06/scheme.jpg
Top photo: http://cdn.c.photoshelter.com/img-get/I0000ucHiGQkHMd4/s/650/650/Biblioteca-Espana-Medellin-Colombia.jpg
Bottom left photo: http://beautyarchi.files.wordpress.com/2011/10/d7.jpg
Bottom right photo: http://www.rutan.org/images/images_video/bibliotecas.jpg

Page 163
Top image: *Locust Street/Mt. Diablo Boulevard Specific Plan*. City of Walnut Creek. July 2010
Top photo: http://www.ruthbancroftgarden.org/rbgarden/pages/localattractions.html
Bottom image: http://www.beyondthecreek.com/update-on-broadway-plaza-redevelopment-in-walnut-creek/
Bottom photo: http://www.walnut-creek.org/civicax/filebank/blobdload.aspx?blobid=4769

Page 165
Top image: https://www.fhwa.dot.gov/environment/environmental_justice/case_studies/village_.jpg
Top photo: http://urbanplacesandspaces.blogspot.com/2006/01/bitter-fruit-in-fruitvale.html
Bottom left photo: http://nextcity.org/daily/entry/leveraging-existing-transit-assets-for-new-transit-oriented-development
Bottom right photo: http://www.fta.dot.gov/images/photos/Fruitvale_1.JPG

Page 167
Top left image: http://www.vatransit.com/files/practices/images_task5/r02-1.jpg
Top right image: http://www.arlingtonva.us/departments/CPHD/planning/docs/pdf/file86957.pdf
Bottom left photo: http://www.eventcrazy.com/Arlington-VA/events/details/415189-Falloween
Bottom right photo: http://3.bp.blogspot.com/-nAMLQT0wY8U/T3TQs5GMbqI/AAAAAAAABUY/Izu3AdL3E7g/s1600/FRIT_Shirlington_7-08_7633.jpg

Page 169
Top image: http://www.pacificmetropolis.com/2006/10/index.html
Bottom left photo: http://www.avision.ca/images/galleries/bySize/sizeA/larger/PA305-Pristine-Vancouver-Skyline-False-Creek-BC-Canada-Downtown-City-Panoramic-Panorama-Chris-Collacott-avision.ca.jpg
Bottom right photo: http://www.insidevancouver.ca/wp-content/uploads/2010/08/dscn4471-large-400x300.jpg

Page 171
Top image: http://www.boora.com/index.php/projects/planning/north_pearl_district
Top photo: http://encorepearl.com/pearl-district.html
Bottom left photo: http://www.museumofthecity.org/wp-content/uploads/2013/07/Tanner_Springs_Park.jpg
Bottom right photo: http://cdn.c.photoshelter.com/img-get/I0000o1lhUMUSXVA/s/860/860/14-011-People-playing-in-Jamison-Square-Fountain-in-the-Pearl-District-of-Portland-Oregon.jpg

THE UNIVERSITY OF UTAH

The University of Utah is a Research I University and the flagship university of the State of Utah. Initially founded as the University of Deseret by a Board of Regents established by Brigham Young in 1850, it adopted its current name in 1892 prior to entering statehood. With over 32,000 students, more than 100 undergraduate programs, and graduate degrees numbering in the 90s – the U has been ranked for over a decade as one of the world's top 100 universities. Sitting on more than 1500 acres of the Wasatch Front, the U is located in Salt Lake City, which is consistently ranked among the nation's most livable cities and best college towns. Salt Lake City enjoys a vibrant urban center, a rich religious history, distinctive neighborhoods, a world-class transit system, and a rather affordable cost of living. Surprising to first time visitors, Salt Lake City is home to an impressively cosmopolitan and diverse population and is becoming known as a 'bohemian' metro area full of plentiful cafes, alternative cultures, avid recreationalists, soccer junkies, amenity migrants, and music venues. The University is located within a half hour from some of the world's best skiing and recreation opportunities. The State boasts an exhilarating lineup of national parks, widely known as the Mighty Five: Zion, Bryce Canyon, Capitol Reef, Canyonlands, and Arches National Parks. In addition, it hosts a few other breathtaking sights: Monument Valley, Natural Bridges, Glen Canyon, Hovenweep, Dinosaur National Monument, Flaming Gorge, Grand Staircase Escalante, and the Timpanogos Cave. The U recently joined the Pacific-12 athletic conference.

THE COLLEGE OF ARCHITECTURE + PLANNING

The College of Architecture + Planning (CA+P) is an active educational community with interests and expertise in the collaborative design and planning of the built environment, multi-disciplinary design, and the evolution of urbanism and urban ecological systems toward a more sustainable, resilient and livable future. In 1949 the Department of Architecture was organized within the College of Fine Arts, and began granting undergraduate and graduate degrees in architecture. The 2003 transfer of the undergraduate planning program from the Department of Geography, the College of Architecture + Planning was born. In 2008 the newly minted Department of City + Metropolitan Planning began granting professional degrees in city planning at the masters level. Other degrees in the College include a Ph.D. in Metropolitan Planning, Policy and Design, as well as a Masters of Real Estate Development (with the Business School). In 2013 an undergraduate degree in Multi-disciplinary Design was added, with faculty from six Colleges participating. The College also offers graduate certificates in Real Estate Development, Historic Preservation and Urban Design. The Graduate Certificate in Urban Design is a jointly operated program by the City + Metropolitan Planning and Architecture Departments. To attain the certificate, students and professionals need to complete a suite of 5 urban design courses, including: a studio, visualization methods, urban design principles, methods in research and practice, and one elective course. Client-based urban design studios are the subject matter of the Utah Urban Design Monograph Series.

College of Architecture + Planning
University of Utah
375 South 1530 East, Suite 235
Salt Lake City, Utah 84112 USA
(801) 581 8217
college@arch.utah.edu
www.arch.utah.edu

STUDIO PARTICIPANTS

INSTRUCTORS
Michael Larice, PhD, Assoc. Professor of Urban Design + City Planning, University of Utah
Jack Robinson, PhD Candidate in City & Regional Planning, University of Pennsylvania

RESEARCH ASSISTANT + MONOGRAPH COORDINATOR
Melissa Fryer

STUDENTS
Gerrard Allam
Melissa Fryer
Kevin Gardiner
Tamara Guy
Kyong Rok Kim
Kevin Leo
Colin Olson
Amanda Roman
Anatoliy Whiting