



CENTRAL PHOENIX/EAST VALLEY LIGHT RAIL TRANSIT PROJECT

URBAN DESIGN

GUIDELINES
JUNE 2001



CENTRAL PHOENIX/
EAST VALLEY
LIGHT RAIL
TRANSIT PROJECT

REGIONAL PUBLIC TRANSPORTATION AUTHORITY

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INTRODUCTION



Urban Design Defined

"Urban design is the art and science of making places for people.

"It includes the way places work and how places look, as well as matters such as community safety. It concerns the connections between people and places, movement and urban form, nature and built fabric, and the processes for ensuring successful villages, towns and cities.

"Good design can help create lively places with distinctive character; streets and public spaces that are safe, accessible, pleasant to use and human in scale; and places that inspire because of the imagination and sensitivity of their designers."

United Kingdom, Department of Environment, Transport and the Regions.

The Valley of the Sun ...This region, its history, its people, its products, its building forms, its recreational opportunities, and its challenges are all shaped by one element ...the light of the sun. If we do not acknowledge its power, we will short change the potential of our design. This does not negate the fact that the sun can be a willing and productive partner. For hundreds of years the sun has warmed our skins, lifted our spirits, grown our crops, and more recently been a partner in generating our power.

If one does not use their intelligence as they encounter the desert, they will surely perish. This place that we call the Valley of the Sun has evolved because of a partnership between the power of the sun and human ingenuity. The Hohokam tribes who first irrigated this valley in the early 1400's, the early American settlers who moved agricultural goods through the heat in the 1870's, and our communities have used numerous cooling techniques and have needed this partnership to thrive.

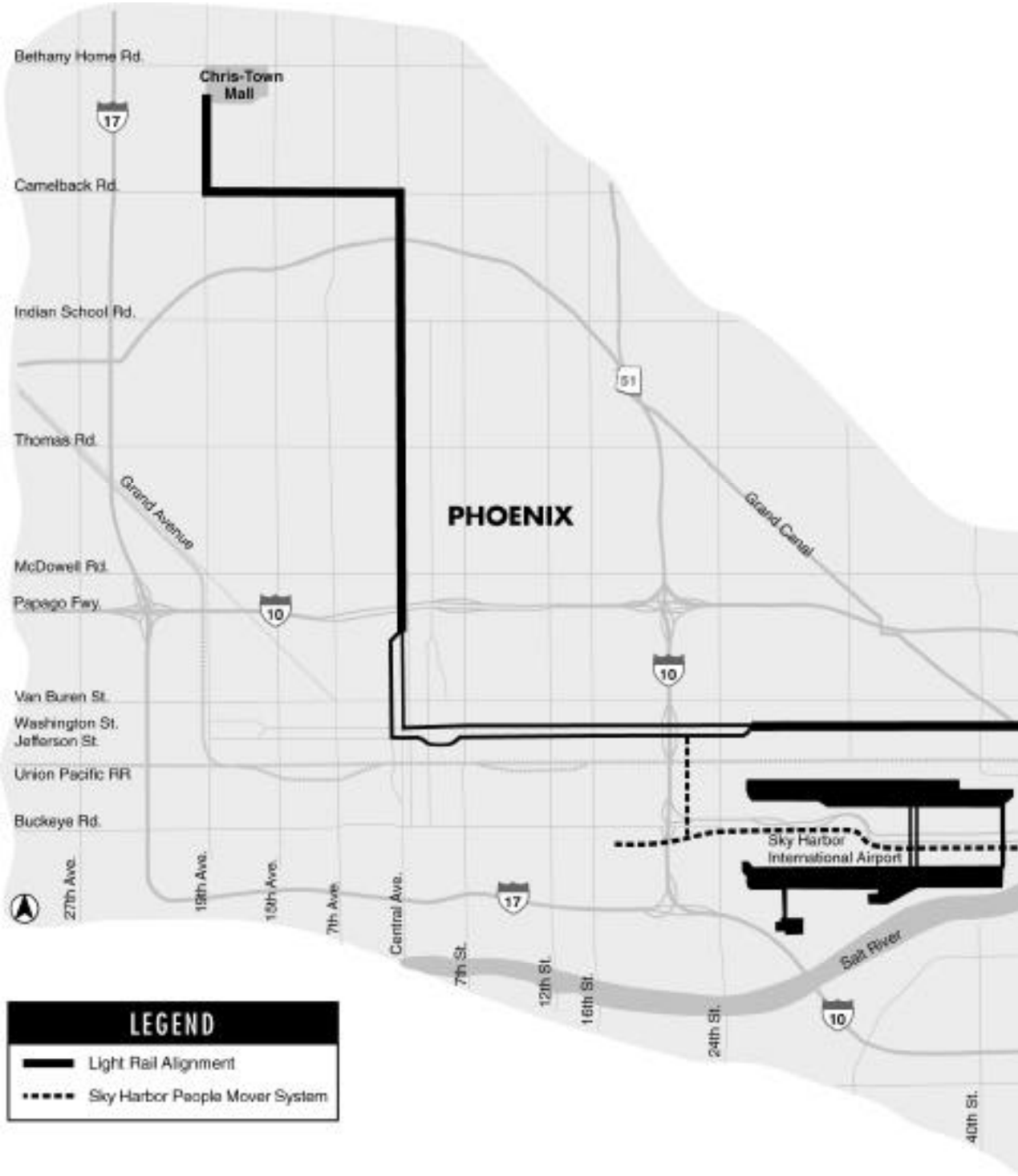
As we embark on creating the single largest piece of infrastructure constructed by the combined cities of Mesa, Phoenix, and Tempe, it should come as no surprise that the sun and human ingenuity will play major roles in form-

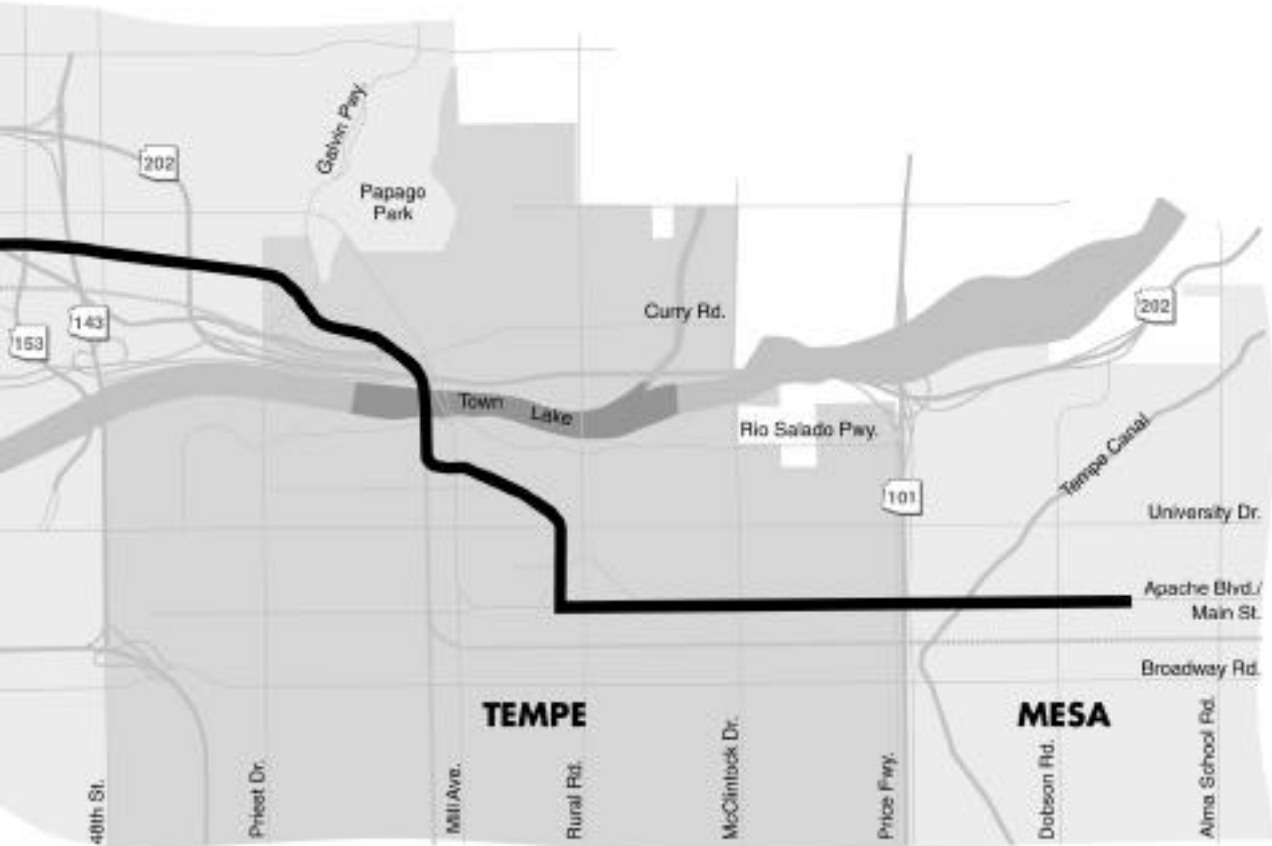
ing of this project. There are few other light rail systems in the world that face the challenges that the design of this system must face. The burning heat of the day and the temperature swings into the night will demand that every single element is reviewed for its appropriateness and its ability to not merely survive, but to function well for the community.

It is this community that funds the system and will be the users of the system. Based on an early understanding of this, the multi-jurisdictional Regional Public Transportation Authority (RPTA) created a process of checks and balances that would guide the design of critical elements. A regional group of city staff and citizens created a vision statement and a set of goals to support the vision. These Guidelines are a direct outgrowth of the vision and goals adopted by the agency and will provide a framework for designing elements within the system.



LIGHT RAIL ALIGNMENT







DEVELOPING THE GUIDELINES

In 1996, the combined cities of Tempe, Phoenix, and Mesa undertook a planning exercise to develop a light rail system to link their communities. Tempe had recently passed a dedicated sales tax for transit. Although an early ballot measure for Phoenix failed by a slim margin of 122 votes, the second measure, which included light rail with an expanded bus plan, overwhelmingly passed in March 2000. Now, in 2001, routes and station locations for light rail have been determined, the preliminary engineering phase of the project is well underway, and the beginning of architectural design is just around the corner.

During the spring and summer of 2000, local transit designers, architects, engineers, and community and project representatives met to take the first step in establishing vision and goals for the design of this project. In Fall 2000, an Urban Design Task Force made up of a diverse group of citizens was asked to confirm and expand the vision and goals, and to give guidance on how these community values could be implemented. The group of citizens involved in this effort included representatives from neighborhoods along the line, small business owners, civic leaders, members of the design community, advocates for persons with disabilities and citizen representatives of city boards and commissions.

An Urban Design Team (UDT), made up of local designers, national transit designers, and agency representatives, was assembled to translate these directives into a document that would guide the system design. In addition, a team of climatologists from Arizona State University researched the special performance needs of materials and cooling systems in our climate, providing input into the guidelines for shading and cooling devices, as well as a separate technical report. The UDT worked to isolate the twenty elements of urban design most critical to the creation of a

light rail system specific to this region and then developed guidelines for each one of those elements. Numerous meetings with the technical staffs of Mesa, Tempe, Phoenix and Valley Connections, site investigations, and community stakeholder meetings also guided the UDT. This document that you now hold is the result of hundreds of hours of community-based dialogue.

As with all civic infrastructure projects, there is a commitment to try and meet the public's expectations of design quality, and not violate the civic trust by exceeding what is viewed as prudent. The Valley's light rail system is no exception to those standards.

During one of our final Task Force meetings, we asked the group to identify the importance of each of the elements by ranking their highest priorities. The results were informative. The category of shade and cooling devices was identified as the single most important urban design element in relationship to the success of the system. If direct sunlight and the temperatures it creates were not mitigated through time-tested solutions, the Phoenix/East Valley light rail system would fail on all levels to serve its constituency.

The Task Force went on to identify the design of stations and adjacent pedestrian areas as important opportunities to define the regional identity, while at the same time ensuring that these transit places behaved as proper civic spaces in the neighborhood and the city. As with all transit systems across the country, this task force also recognized the need for a secure, inviting, and well-maintained system by voting security as a priority.

Also considered of high importance were the overhead catenary system, the ease of pedestrian connections between bus and rail, and finally, the look and design of the light rail vehicle itself.



Vision Statement

Create an efficient regional transportation system that offers the new choice for linking communities and people with jobs, culture, and events. A fun, easy to use, and attractive system that respects the people who use it and the people it passes by.

In a community where utilities are undergrounded, special attention needs to be paid to the design of the poles. Understanding the importance of multi modal benefits and the heat of the sun, riders must walk as little as possible when transferring from train to bus. And finally, in a region where the private automobile has had a huge impact on lifestyle and land development it comes as no surprise that the task force would look to the vehicle design for "their" light rail to be modern, dynamic, and comfortable.

These priorities reflect the high level of citizen knowledge and understanding of region specific issues that face the design and function of this light rail system. It should be noted that this understanding did not bubble up out of a discussion on city-by-city parity; rather it came from an understanding of the common needs of all of the neighborhoods within the Valley of the Sun.

It is our hope that this project can become much more for this place than merely a rail system. It can be the new infrastructure for a new way of thinking. It can create the realization by its example that this is a diverse and vital place. A place of opportunity. A place that is full of choices. A place that is not limited by boundaries. A place where ingenuity, culture and nature have formed a valuable partnership.

Vision

The vision for this project (highlighted above) encapsulates the values of this place and can be broken into the significant phrases that are outlined below.

New Choice

- ☼ Provide new options for riders from many walks of life – the young and the old, those with disabilities and those who are mobile, the tourist, the residents, riders from choice and riders from necessity.
- ☼ Promote walk-ability and bike-ability of users wanting to connect to rail.
- ☼ Enable the community to feel good about taking the train.
- ☼ Streamline trip making for all users through simplified ticketing and transferring. Build on, and enhance, the service to current bus ridership.
- ☼ Use marketing to provide information that is helpful as well as creating sense of fun when riding the system.
- ☼ Promote a sense of novelty and discovery through the experience of the system as a whole.
- ☼ Build new public and private partnerships with developers, planners,



and neighborhoods to create opportunities that capitalize on the system to promote community change.

Regional System

- ☀ Establish a new model of cooperation for future regional and city-to-city partnerships through the creation of this system.
- ☀ Encourage departments within each city to collaborate for the benefit of creating better community and neighborhood solutions.
- ☀ Use a prudent decision making process which builds public trust.
- ☀ Provide a regional identity that relates to the best of the Valley cities and reflects the pride of our residents.

Linking Communities Transit-Oriented Design

- ☀ In coordination with the cities of Phoenix, Tempe, and Mesa, and neighborhood plans, use transit-oriented development zoning to guide development adjacent to stations to complement the rail system.
- ☀ Design stations and station areas to encourage and stimulate the economic vitality of the region.
- ☀ Design stations to reflect and reinforce the identity of the adjacent neighborhood.
- ☀ Be creative in coordinating with infrastructure revitalization and neighborhood revitalization projects.
- ☀ Understand the energizing principal of rail and use it to its advantage to create places of value.

Linking People to Destinations

- ☀ Provide linkages to regional cultural, sports, retail, and employment venues.
- ☀ Organize the stations and encourage adjacent development to create efficient trip planning and to give residents enhanced mobility.
- ☀ Develop partnerships for ticketing, discounts, marketing, parking, scheduling with cultural, sports, entertainment, county, regional, educational, and private entities to encourage expanded riderships and provide wider access to events and culture.
- ☀ Through ease of use, efficiency of route planning, scheduling, and station location makes the system serve the needs of the ridership.
- ☀ Provide clear pedestrian mobility, automobile connections, and service access when designing stations.

Respects the People Who Use It

- ☀ Acknowledge riders with a system that moderates the heat swings of the desert environment.
- ☀ Ensure that every aspect of the entire system (including signage, architecture, wayfinding, furniture, lighting, and voice and visual communications systems) is fully ADA accessible.
- ☀ Promote safety through good design and layering of land uses to encourage "eyes on the street" and Crime Prevention through Environmental Design (CPTED) practices.



- ☀ Provide acceptable comfort for the user of the system in terms of temperature mitigation and sun glare when approaching the platform, waiting on the platform, or riding in the vehicle.
- ☀ Stations should use easily maintained materials and designs that will resist vandalism, and facilitate low cost replacement parts.
- ☀ Landscaping should be used as a tool to provide visual relief from the urban environment and shade from heat.
- ☀ Research the use of creative and time-tested material/design solutions (especially energy efficient or solar options) that conform to the rigorous demands of this climate and provide long-term durability.
- ☀ Look for ways to include current and future conveniences into the station configurations.

Respects the Places It Passes Through

- ☀ Station design and its related elements should enhance, preserve or exceed the current urban design qualities of the station area and surrounding community.
- ☀ Design stations and station areas to respect the desert environment, the landscape, and the neighborhood in which it sits.
- ☀ To whatever extent possible attempt to preserve or replace significant landscape elements deemed valuable to the greater community.
- ☀ All system design elements should be respectful of historic elements.
- ☀ Stations and station areas should be designed to create optimum bicycle,

pedestrian and bus connectivity.

- ☀ The potential for system operation noise, parking noise and overflow of parking into neighborhoods should be mitigated through design on a case-by-case basis.
- ☀ Lighting for stations, station areas, station approaches and the system should be designed so as not to negatively impact adjacent uses.

Attractive

- ☀ The light rail vehicles should be designed to reflect a system identity that is distinct from the bus system and promotes a streamlined transportation alternative.
- ☀ The interior of the light rail vehicles should be designed to accommodate the wide range of ages, abilities, and baggage.
- ☀ Public art should contribute to the experience of riding the system by providing a sense of discovery and wonder.
- ☀ Connections between the neighborhood and the stations should be designed in such a way so as to encourage ridership.
- ☀ Approaches to stations and park-and-rides should be well lit and free of barriers.
- ☀ Stations should be designed to be attractive and a pleasant place to wait.
- ☀ Consider enhancing view corridors or creating new ones along the alignment.
- ☀ Public art can be a wonderful tool to use in landmarking and providing symbolic connections between the neighborhood and the system.



Efficient

- ☀ Create headways, alignments, and operating schedules to develop a system that becomes a viable alternative to the automobile.
- ☀ Create well-lighted, clearly signed, and appropriately improved pedestrian routes between rail, bike routes and other modes of transit.
- ☀ All designed systems must undergo rigorous review for maintainability, environmental specific conditions, and transit industry standards.

Easy and Fun to Use

- ☀ Pay attention to the rider's experience while on the vehicle. The ride is as important as catching the train.
- ☀ Create easy to understand system maps within the cars and ensure the clear readability of the station signage.
- ☀ Signage should be appropriate in scale, materials, colors, and lighting so as to be a good neighbor in every environment.
- ☀ Designs for public art and architecture should be created with a timeless sensibility, transcending fad, fashion, the one-liner, and personal design ego. The work should address the repeat as well as first-time user.
- ☀ The environment is both harsh and beautiful. Every effort should be made to design with an approach to adapt to it rather than overpower it.
- ☀ Impart upon artists and architects the message that the system will be used by families, welders, children, tourists, sports fans, opera fans, librarians, conventioners, people of all ages, all economic strata, and all colors. It is imperative that all feel

welcome all of the time and that the designs create an open and an inclusive atmosphere.

- ☀ Engage the user in a built environment that calls attention to the beauty of the environment, the wonder of place, and the human history that has made its home here.
- ☀ Whenever possible, the artwork and design elements should engage the rider in a dialogue about the civic and the personal, connecting rider with community and community with place.
- ☀ The Valley has been described by many as a place of opportunity. Ensure that the organization and the design of the system look to the future and promote the notion of a "modern" experience.

HOW THESE GUIDELINES WILL BE USED



These Design Guidelines will act as a documentation of a community's agreement between the agency, designers, design review boards, the rider who uses the system, and the neighborhoods it passes through. It is intended that the values expressed in this document accurately reflect the values of the community and the design process.

Engineers, neighbors, architects, stakeholders, artists, jurisdictional bodies, and landscape architects are but a few of the groups who will interpret the contents.

In an age of changing technology, we must never lose sight of the physical impact of a twenty-mile light rail system on the landscape of this Valley. Designers should be encouraged to be respectful of what already exists, reach to the future for new solutions, but not be so quick to embrace the new that elements become immediately dated. The design process should create a system that citizens and municipalities will be able to use for the next fifty years.

Just as the designers of this system will need to form a partnership with the design intent of this document, so must the agency form a partnership with the community in the preservation of the executed designs. It would be a shame for the designers to adhere to the guidelines and then have the designed elements become tired due to a relaxed approach to maintenance. Non-transit riders are always quick to point to perceptions about lack of safety and cleanliness as reasons why they do not use a system. Trash removal, paint maintenance, ticket vending reliability, conservation of public artworks, and attention to preservation of landscaping are just a few of the more visible arenas in which the agency must play an aggressive role.

To build a complex system in a complex environment is no easy task. This document shall remain as a touchstone to:

- ☀ Establish a commitment of excellence between the transit agency and the communities.
- ☀ Guide the design and review of all elements and be used as a performance checklist by the agency.

Budget Constraints

The priorities identified by the Urban Design Task Force and the team will be used during the cost review process to help set the parameters for the light rail system. If the project is unable to fund all of the steps identified in this document, the highest priority urban design elements will receive first consideration.

Design Review

All design work (engineering, architecture, public art, landscaping, and urban planning) will be reviewed by a multi-disciplinary team of managers within the light rail project.

It will be anticipated that, unless otherwise stipulated, all designers' work (engineering, architecture, landscape architecture, and art) within a station area or alignment segment will be reviewed within the same session. It is critical that station areas and alignment segments be reviewed holistically rather than piecemeal. Upon reviewing designs, written directives will be submitted to the designer by the appropriate Manager. Once approved or approved with revisions and reviews, designs will then move forward through neighborhood/stakeholder presentations and jurisdictional artist and design review presentations.

Companion Documents

These guidelines, along with the Station Area Planning Notebook and the Engineering Design Criteria, will direct the engineers, architects, landscape architects, and artists for the light rail project.



SYSTEM FEATURES



SYSTEM IDENTITY

The urban skyline of this Valley is rich beyond compare. With its historical structures and recently designed dynamic buildings, this region has always sought to define place. It could be argued that rather than define a specific look, what really has been developed is a collection of urban forms that celebrate resourcefulness and creativity. But, there can be no serious consideration of the architectural heritage in this Sonoran valley without acknowledging the pioneering work of Frank Lloyd Wright. It was his attention to human scale, the harnessing of the sun's dance of light and shadow, his partnership with the dramatic desert landscape, and his use of indigenous materials which had a profound affect on every designer and every building that came after. Mr. Wright's impact on this region continues to endure the tests of time and operate as a guide to our search for the built identity of this light rail system.

The system identity of the Central Phoenix/East Valley light rail system will emerge as the logical, functional, and aesthetic integration of the physical components of the system and a celebration of the desert cities it will serve. By carefully connecting with the uniqueness of the built or planned environment along the line, creating "oasis like" stations and platforms that act as urban climactic comfort zones, and creating a sophisticated and uniquely linked series of design elements, the system will derive a visual wholeness that enhances its community image.

The entire system and all its elements must be critically linked by an aesthetic and functional philosophy that is inspired by the "place". The idea that the system might be perceived and cherished as a linear desert oasis would be ideal. Through a rigorous evaluation of all design elements in the system, a strong sense of connection

to the land must give the system its memorable character and rightness.

The system identity will be the ultimate result of all of the urban design goals being accomplished in a successful and exemplary manner. All components of the system from the vehicle to OCS, from rail beds to stations, from furniture to graphics, from color to materials, and from daytime sunlight and shadow manipulation to nighttime illumination of the system will affect system identity.

Urban Design Performance Criteria

- ☀ Architecture and shelter must be responsive to the desert climate and environment of the region.
- ☀ An architectural kit of parts should be established that will provide design unity, universal functionality, and most importantly, overall system identity.
- ☀ The architectural program shall develop a palette of colors, materials, textures, and vocabulary of design solutions which will serve as a foundation for the system identity.
- ☀ Citizens and visitors to the community must have their awareness of the "place" enhanced by the design of the system.
- ☀ The system architecture should emphasize textural complexity to amplify the dynamic of the light and shadow from the desert sun.
- ☀ Develop asymmetrical massing of building forms rather than symmetrical and orthogonal constructs, thus creating elements more naturally appropriate to the remarkable geological features of the region.
- ☀ All components of the system architecture, art and landscaping should utilize a mix of shadow and sunlight, which reduces the negative

perceptions of both and celebrates the beauty of the movement of light and soothing power of shade.

- ☀ Reflecting the indigenous sense of place, the architecture should be low and appear to grow from the site rather than merely sit on it.

Importance to User's Experience

Form: High

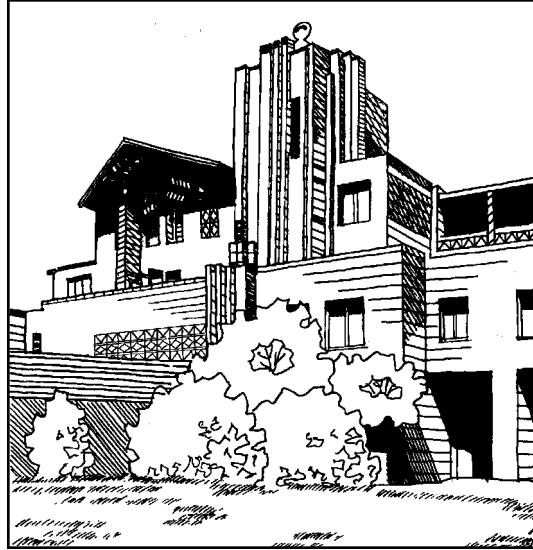
The image of the system will make it a community asset of pride and quality, and of perceived comfort.

Function: High

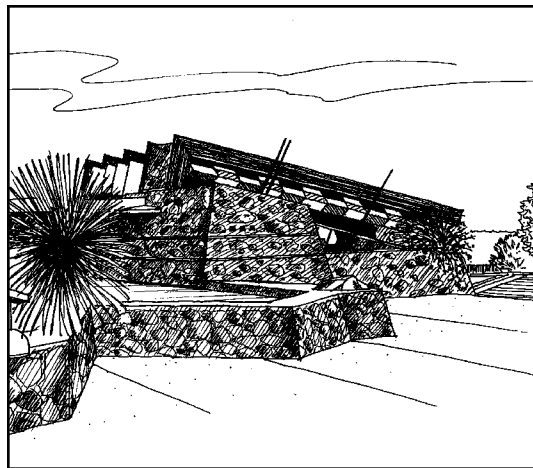
The identity will create a sense of logical order, ease of use, and user efficiency.

Cost

Negligible



Arizona Biltmore Hotel



Taliesin West



Phoenix Central Library



LIGHT RAIL VEHICLE

While the stations will be a fixed architectural element within a neighborhood, the light rail vehicle (LRV) will provide a dynamic counterpoint, visiting every single neighborhood night and day.

In this region, the regard for private vehicles seems to carry over into high standards for the design of civic vehicles. Based on public input, the appearance and comfort qualities of the LRV will have a key role in building new transit ridership and community pride within the cities of Mesa, Phoenix, and Tempe.

The LRVs planned for this system will be approximately 90 feet long and be configured into 1, 2, or 3 car trains. The capacity for a single vehicle is approximately 75 riders sitting and 75 standing. The trains that will be used in this system will be what are referred to as 70% low floor. This means that 70% of the seating area will be ADA accessible. The remaining 30% of the seating area is located above the wheels and will be accessed by stepping up approximately one step.

Although the internal mechanisms of the vehicle remain constant, elements such as shape and size of windows, shape of the vehicle ends, and colors are all exterior decisions to be made. On the interior of the vehicle, the ability to determine seating materials, the number of seats which fold up to make room for wheelchairs and bikes, configuration of the seats, hand rails, climate control devices, signage, and graphics are decisions to be made by the designers.

The vehicle specification process (including project engineering, architectural, and artist staff) will investigate potential custom additions to existing vehicle designs that will reflect the design integrity of the system. The exterior graphics and interior layout of the vehicle offer opportunities to provide service that is uniquely adapted to our

riders and will be developed in close collaboration with marketing staff.

Urban Design Performance Criteria

Overall Design Approach

- ☀ Design the vehicles to be visually distinctive and appealing, reflecting a modern, forward thinking image.
- ☀ The design aesthetic of the vehicle and it's graphics should be a contributing factor in shaping the identity of this system that includes engineering elements, architecture, and graphics.
- ☀ Provide vehicles that are quiet; assure that design of LRV wheels, trackwork, and HVAC units are coordinated to minimize noise.
- ☀ Prohibit the use of advertising on the interior and exterior surfaces of the vehicles. If advertising is ever added to the interior or exterior of the vehicle, it should play a subservient role to the overall system identity. Under no conditions, should the advertising be allowed to dominate the appearance of the interior or the exterior of the vehicle.
- ☀ The agency should develop specific guidelines to include interior notices from social service agencies, cultural, and civic institutions.

Exterior Design

- ☀ Emphasize exterior surfaces with metallic finish or paint finish to allow trains in motion to be shaped by the sunlight and trains at the stations to be dynamic.
- ☀ Minimize glare from exterior surfaces to avoid intrusive reflections for motorists or pedestrians.
- ☀ Coordinate color and graphic design of LRV with other system



wide elements; graphics on vehicle exterior should be minimal but memorable.

Heat Mitigation

- ☀ Provide effective HVAC devices to mitigate the regional climate.
- ☀ Provide back-up venting systems (e.g. additional operable windows or operable vents) that allow for effective, interior air circulation should the air conditioning system fail.
- ☀ Pursue alternative window technologies or screening materials to minimize heat gain from sun.

Interior Design

- ☀ Maintain a window type and dimension that promotes visibility of street signs and landmarks outside the vehicle for passengers with visual impairments and also maintain visibility of vehicle occupants from the street.
- ☀ Design vehicle windows to offer the rider a level line-of-sight while either standing or sitting.
- ☀ Ensure that people of different heights, sizes and abilities have a variety of comfortable seating types and handholds.
- ☀ Utilize vandal resistant materials that are comfortable for the rider but are easy to clean, maintain and replace.
- ☀ Provide digital/audible information systems to facilitate rider awareness of upcoming stations; explore use of vehicle locating technology to provide a graphic display of the vehicle in relationship to overall system.
- ☀ Explore the ability to provide information apprising riders of natural,

historical, and cultural features in a non-intrusive media.

- ☀ Provide map of overall system and system amenities on each vehicle.
- ☀ Facilitate ease of those with disabilities through the incorporation of appropriate signage and announcement systems.
- ☀ Provide space for bicycles on each LRV (number of bicycles to be accommodated shall be determined by RPTA).

Importance to User's Experience

Form: High
 Vehicles create system-wide image for LRT system.

Function: High
 Transports riders through region in comfortable, clean, quiet, and efficient manner.

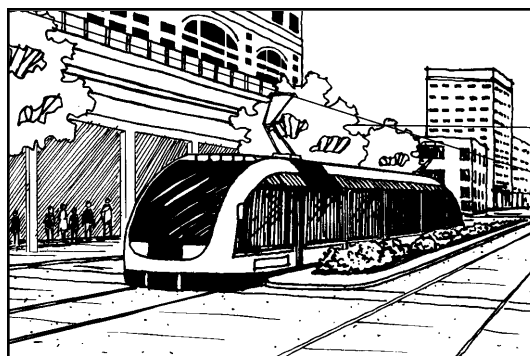
Cost



% of Overall Budget



% Urban Design Affects Element



Modern, Forward Thinking Design



OVERHEAD CATENARY SYSTEM

Light rail vehicles are powered by electricity. The overhead catenary system (OCS) is what delivers the electrification to the trains. The OCS is made up of three elements - a 22 to 24 foot high metal pole, a system of cross arms fixed to the uppermost portion of the pole, and the wires - either a single or double wire set-up, with the lowest wire making contact to the vehicle as it travels through the streets.

In this system, the poles will be set into the middle of the street or the side of the street along the alignment. It is anticipated that the poles will need to be spaced from approximately 90-170 feet apart. These poles must meet rigorous strength, access and maintenance guidelines, but there are a number of traditional LRV transit shapes ranging from square to round that can be considered. The usual hardware set-up consists of up to four galvanized metal cross arms. Each of these arms angle and height is adjusted in the field and maintaining that measurement is critical to the operation of the vehicles.

Obviously in this Valley, where urban design practices encourage limited signage heights, undergrounded utilities and median beautification projects, special care should be used to design this repeating element. This will be no simple task. Not only are there pockets of existing community identity programs, but there are also numerous locations along the alignment where specialty site-specific street lighting fixtures have been installed to accentuate neighborhood's pride of place.

Even though most OCS pole locations will not occur within pedestrian or transit rider circulation paths, these vertical elements need to behave like a respectful guest as they travel from one neighborhood to another. It should be noted that the presence of the OCS need not be viewed as a merely an intrusion to be mitigated. It can provide an opportunity to add a new layer of regional

organization or create a sense of scale between architecture and humanity in some fragile neighborhoods.

Therefore, we recommend a collaborative design process that would include architects, artists, and engineers to investigate a variety of design solutions which would range from a round tapered pole, to a partially custom designed pole, to a fully customized pole design/enhancement that will ultimately reinforce the overall design identity of the system and meet the numerous urban design needs of particular neighborhoods. Factors that will be evaluated in this process include cost, design, form, function, color, shape and maintenance needs.

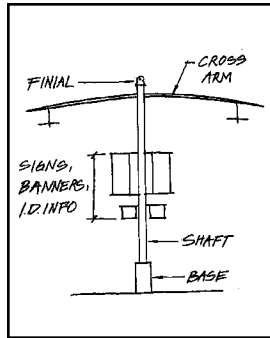
Urban Design Performance Criteria

- ☀ Provide a visually non-intrusive OCS within the streetscape environment.
- ☀ Limit the number of pole-types in order to create a system identity and reduce visual competition among already existing light pole styles.
- ☀ Design the OCS components to be as simple and elegant as possible.
- ☀ Preliminary recommendation would be to use single contact wire in the down town areas (Phoenix, Tempe and Mesa) and double wire where speeds meet or exceed 35 mph.
- ☀ Provide design continuity by utilizing a system-wide standard pole and cross arm design.
- ☀ Possible additional functions that may be served by the OCS pole include neighborhood identity elements and lighting.
- ☀ Rigorous care must be taken to avoid the creation of a pole and

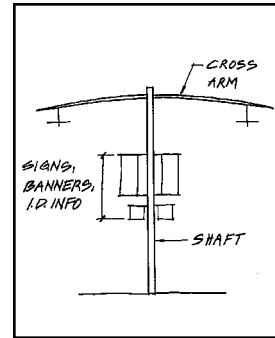


delivery system that would pose unique or difficult maintenance and replacement exercises.

- ☀ Utilize natural metal finishes or painted surfaces to achieve a blending with the dominant blue skies of the Valley.
- ☀ Minimize cross-section of OCS pole and cross arm to reduce visual mass.



Detail A:
Double Mast Arm



Detail B:
Double Mast Arm

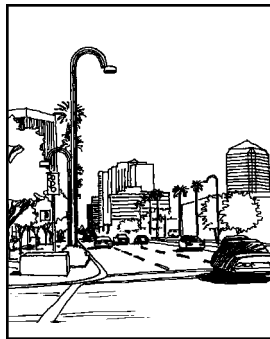
Importance to User's Experience

Form: High

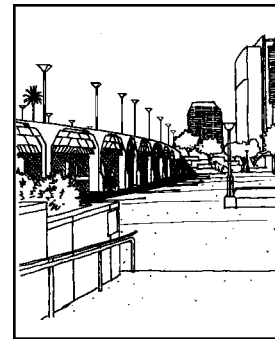
- ☀ Highly visible and numerous; can be objectionable.
- ☀ Requires simplicity as background architecture.

Function: Low

- ☀ Little or no effect on user's experience.



Existing pole
Central Avenue

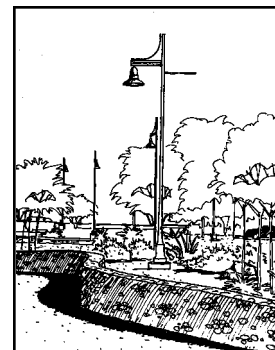


Existing pole
Mill Avenue

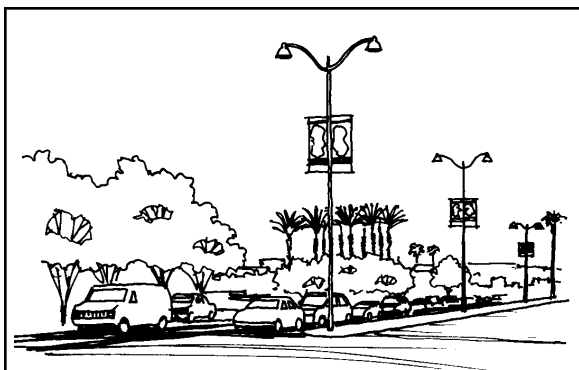
Cost of OCS



Existing pole
Overpass at Deck Park



Existing pole
Tempe Beach Park



Existing pole
Main Street



TRACKWAY

The trackway is the paved surface between the rails of a track and extending approximately four feet beyond each rail. It also includes the area between the two tracks in a double track situation. In this project, the most common trackway condition is a median location in the center of the street containing a track in each direction. A second condition is a side location where the trackway is adjacent to the street curb and contains one track in one direction or two tracks in both directions. A third condition is where there is a single track in one direction next to a frontage road, such as the Jefferson/Washington couplet. Unique conditions occur in pocket storage tracks (near stadiums) and along the Creamery Branch and the Tempe Town Lake Bridge - both in Tempe.

It has been determined that the trackway, the most continuous element within the system, will be expressed through the use of a consistent paving treatment. A ribbon of material will be continuous between the rails and then the remainder of the trackway will have paving that can be neighborhood specific, such as textured concrete, concrete pavers, decomposed granite, or other porous materials. Final determination of the materials adjacent to the rails will occur as part of the station area design process.

The separation of the trackway from adjacent vehicle lanes or pedestrians is known as track delineation. The function of track delineation is to create clear, logical, and safe circulation routes for street vehicles around the stations and trackway and to protect riders and pedestrians from oncoming trains. In order to integrate the light rail appropriately into the surrounding environments, buttons should be used to delineate street-running trackways in the downtown areas and curbs should be used where the LRV speeds meet or exceed 35 mph.

Urban Design Performance Criteria

Trackway Paving

- ☀ **Pave area between the rails in cast-in-place concrete.**
- ☀ **Pave trackway areas other than between the rails in ADA appropriate textured concrete or concrete pavers within all station area zones (i.e. within 1/4 mile radius of each LRT station).**
- ☀ **In all other locations, pave trackway areas other than between the rails in concrete or decomposed granite.**
- ☀ **Ensure that trackway concrete color contrasts appropriately with adjacent street, when concrete is used as trackway paving.**
- ☀ **Ensure that over the track current and future pedestrian movements can be accommodated.**

Track Delineation

- ☀ **Track delineation devices should be provided along all portions of the system and should coordinate in design, style, color, and materials with other system-wide elements.**
- ☀ **Utilize buttons to delineate street-running trackbeds in the downtown areas; utilize curbs where the LRV speeds meet or exceed 35 mph.**
- ☀ **Locate curbs at both edges of tracks, adjacent to sidewalks and to streets, except at pedestrian crosswalks and vehicular intersections.**
- ☀ **Provide tactile paving strips at both edges of tracks at all intersecting pedestrian crosswalks.**
- ☀ **Fabricate buttons from steel, precast concrete, or other materials that relate to the system identity. Make size, shape, material, and color of**

buttons system-wide to ensure ease of recognition by motorists.

- ☀ Ensure that buttons are of tough materials and a design that will stand up to the rigors of arterial street use over a long life span.
- ☀ Utilize a system of bollards and cables as needed to safely control pedestrians at high boarding and/or special activity sites such as sports venues and schools.
- ☀ Ensure that event delineation has maximum flexibility to accommodate both peak loads and daily boardings.

Importance to User' s Experience

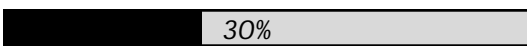
Form: High
Seen by all transit users, neighbors and drivers of vehicles on the street. Along with OCS, the most widely distributed design element.

Function: High
Track delineation devices are very important in protecting the safety of pedestrians and motorists and in preventing accidents with LRT vehicles.

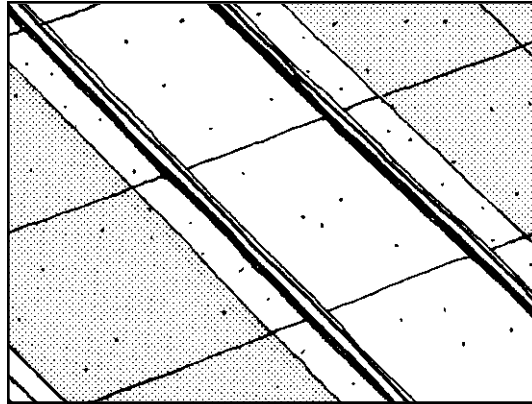
Cost of T rackway



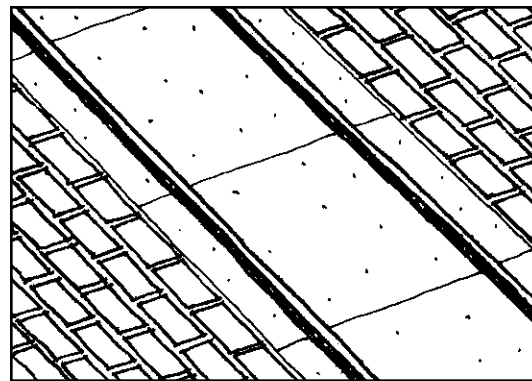
% of Overall Budget



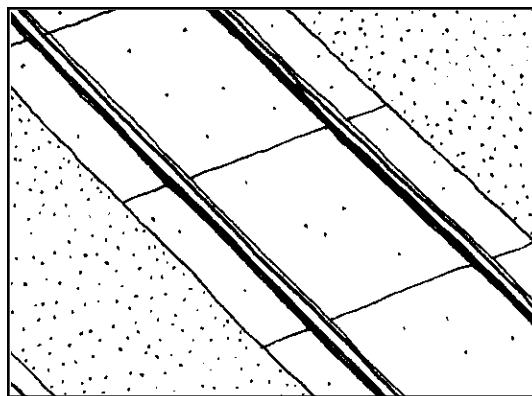
% Urban Design Affects Element



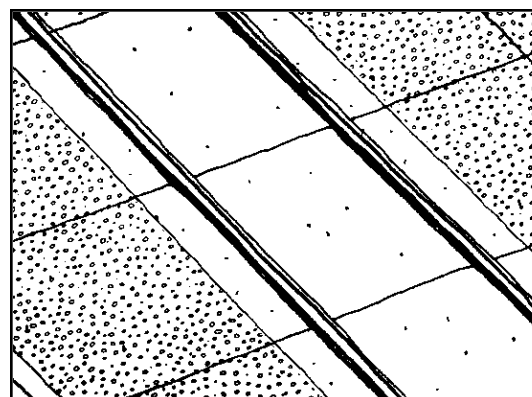
Colored Concrete



Unit Pavers or Stamped Concrete



Exposed Aggregate Concrete



Decomposed Granite



SYSTEM BUILDINGS

System Buildings include various enclosures along the alignment that house necessary electrical and communications elements.

Traction Power Sub Stations (TPSS), which occur about every mile, deliver the electrical current to the overhead catenary system which ultimately delivers the power to the vehicles. These safe, secure, and temperature-controlled structures are approximately 20 by 40 feet and must be located within 300 feet of the station. These enclosures need to be accessible by a maintenance vehicle should the equipment become disabled; however, the routine maintenance schedule only calls for a single person walking up and into the building once a month to monitor the equipment.

Smaller Signal/Communication Buildings (approximately 10 x 10 ft.) are used to relay various data between the train, the operations base, and the signal system.

It is critical to ensure that the system buildings are designed to be as unobtrusive as possible to the immediate neighborhood. Since these buildings do represent the system and can be strong transit wayfinding devices in and of themselves, they should reflect the identity of the system. However, these are in no way small enclosures and therefore need to respect their immediate surrounding in character, materials, and placement.

Urban Design Performance Criteria

- ☀ Placement of the structure should:
 - Locate within a nearby office building or parking structure; or
 - Occupy a location that is buffered from or not readily visible from the public right-of-way; or
 - Use systems buildings creatively integrated with other amenities, such as a backdrop for bench

seating, a place for artwork, or part of bicycle storage. Avoid a bolt-on look of furnishings.

- ☀ Emphasize pedestrian-oriented and human-scale treatment of enclosures in terms of materials used, artwork, landscaping, screening and other treatments.
- ☀ Site the Systems Buildings allowing sufficient access for maintenance and operations workers and equipment.
- ☀ Consider the possibility of re-using building takes along the LRT alignment for siting of equipment.
- ☀ Consider security of stations and surrounding areas and utilize CPTED principles when siting system buildings.
- ☀ Consider adjacent neighborhoods, existing paths of pedestrian travel, neighborhood amenities, and “eyes on the street” from adjacent businesses and residences when siting the systems buildings.
- ☀ Articulate and clad buildings, when appropriate, to identify this as an element within the transit system design vocabulary.
- ☀ Consider the use of glass, or other non-opaque materials, and night time interior lighting to mitigate building mass and create a “somebody’s home” atmosphere.
- ☀ Utilize design solutions for details such as doors, vents, and drains that show care and avoid a “tough-shed” appearance.

Importance to User's Experience

Form: Medium

Visibility of Systems Buildings is not critical to the successful user experience

of the system. They can be located out-of-view as structures that are low profile, avoiding a negative impact.

Function: Low
Little benefit to pedestrian or rider's positive experience.

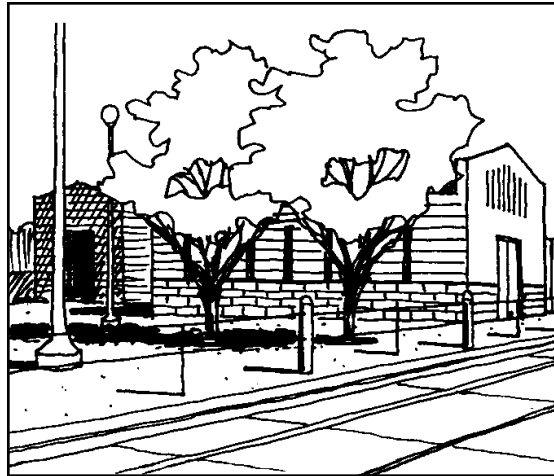
Cost



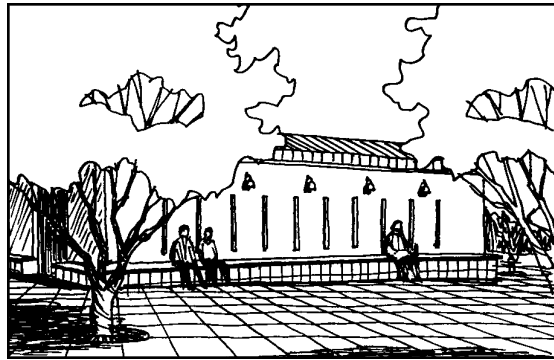
% of Overall Budget



% Urban Design Affects Element



Architectural TPSS, Buffered by Vegetation



TPSS with Integral and Lighting



TPSS in Nearby Structure



MAINTENANCE AND STORAGE FACILITY

The maintenance and storage facility provides the necessary workshops, storage tracks and yards needed to maintain the rolling stock of the system. The yard will cover approximately 30 acres and the architectural portion of the facility will be approximately 55,000 square feet. Beyond the storage of 40-100 vehicles, the yard will also provide storage space for spare parts of all kinds that relate to system maintenance.

The facility will house the operations base, data and communication devices, and some administrative staff. It will serve as the point of departure for drivers beginning and ending their shifts. There will be the need for showers, male and female locker rooms, break rooms, and kitchen facilities. The need to function at the highest level as an efficient and safe work environment is paramount and should be double-checked at each design milestone.

As with all systems, it is anticipated that there will be considerable school children, members of the public, and representatives from other systems who will want to visit the facility.

Through the architectural and art design process, in collaboration with the system engineers, the project team should ensure that the facility is state of the art in its functional elements, provides an efficient and enjoyable work environment for those employed, and presents a design to the community which is reflective of the system and agency values.

Urban Design Performance Criteria

Site Location

- ☀️ Develop a site master plan that:
 - addresses surrounding land uses and development, and
 - has a sensitive site design and responsive architectural compatibility.

- ☀️ Provide convenient access to the rail system main line with minimum deadhead mileage.
- ☀️ Provide adequate roadway access, parking and drop-off for employees, school buses and individual visitors, as well as the efficient delivery and pick-up of materials.
- ☀️ Create pleasant and interesting buffers between the site and neighboring community:
 - Use earth berming, landscaping, unique fencing and lighting.
 - Provide an attractive screen fence if noise is not an issue; otherwise provide an adequate, well designed sound wall or landscaped berm.
- ☀️ Orient the bulk of the building to the street side of the site; establish a street edge that is compatible with the building's urban context.

Facilities

- ☀️ The design should have architectural integrity, be functionally sound and reinforce the system's identity, rather than reflect architectural ego or style.
- ☀️ Equal, and exceed if possible, the level of design excellence in adjacent development.
- ☀️ Coordinate the design vocabulary with architectural materials, elements, and colors present in other related elements to reinforce the system identity and marketing strategies, resulting in a clean, modern, efficient system.
- ☀️ Celebrate the industrial character of the facility, seeking dynamic structural forms that reflect the underlying functional requirements.



- ☀ Incorporate select views into visually intriguing yard and shop operation for the benefit of visitors to the site.
- ☀ In view of the site locations under consideration, consider the need to design for observation by plane and/or from an adjacent freeway. The design should reflect design excellence from above as well as from the elevation.
- ☀ Make the facilities visitor-friendly by incorporating features that enhance visits such as visitor orientation and viewing areas and space for informative displays.
- ☀ Design a pleasant and highly functional work site based on respect for the employees and research of the best practices from similar LRT facilities. Interview employees from other facilities to determine optimal design features.
- ☀ Create an efficient and pleasant place for facility workers; incorporate shaded outdoor work and break zones.
- ☀ Provide paving options other than asphalt for the yard surface; use "Best Management Practices" (BMPs) to treat runoff from yard areas in an ecologically/environmentally friendly manner.

Energy Efficiency

- ☀ Include sustainable, time-tested environmentally friendly & solar engineering solutions, where possible.
- ☀ Daylight interiors through the use of clerestories, skylights, and/or fabric roof panels.
- ☀ Orient buildings to take advantage of shading opportunities and reduce heat gain.

- ☀ Provide as much shaded storage area for light rail vehicles as possible to reduce thermal gain.

Importance to User's Experience

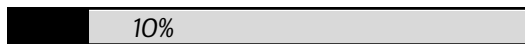
Form: Low
 Scale of structure has visual impact on neighborhood & users.

Function: Low
 Virtually no relationship to users.

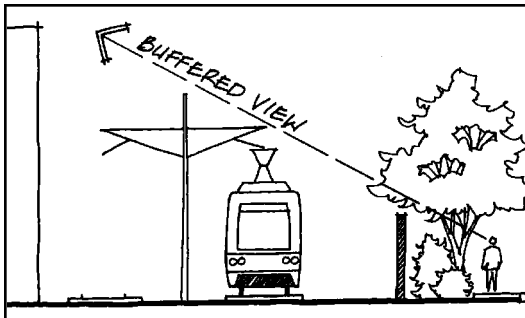
Cost



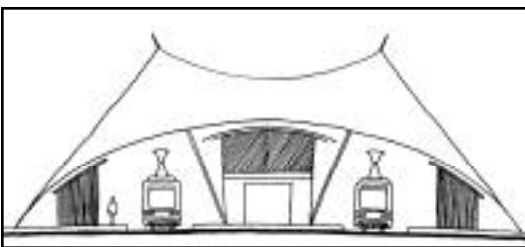
% of Overall Budget



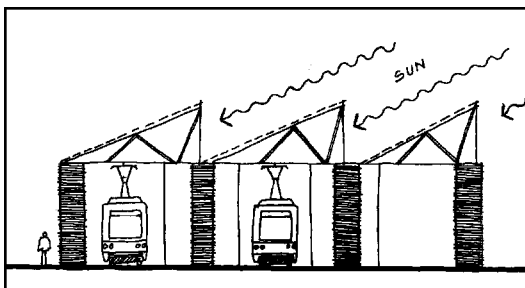
% Urban Design Affects Element



Views Buffered from Surrounding Properties



Enhanced Facade and Roof Line



Enhanced Facade and Repeated Roof Line



BRIDGES AND WALLS

The Arizona Department of Transportation has done much in this region to raise the bar of infrastructure projects through inclusion of artists within the design process of projects such as the Hohokam Expressway or the Pima 101 Freeway. As Valley Connections constructs this transportation system that will pass over canals, lakes, and freeways, it is important to continue this design tradition.

A new bridge will be necessary to convey the LRT system across Town Lake in Tempe. This bridge will be dedicated to the LRT system only, and will be located between the existing vehicular bridges and railroad trestle in close proximity to the railroad trestle. Other bridges require retrofitting to serve the LRT system.

Walls include retaining walls and freestanding walls used anywhere within the projects. Retaining walls are used for retaining fill and/or cut areas of the trackway. Freestanding walls can be used to visually screen project features from other public or neighborhood uses, or to provide noise buffering.

These forms can enhance our regional identity by suggesting that this is a community that takes pride in place. To continue this value-added approach to design, it is recommended that artists work hand in hand with engineers to design this system's built identity.

Urban Design Performance Criteria

Bridges

- ☀ Explore a rhythm of structural elements (piers, beams, trusses, etc.) that is complementary to and respects the rhythm of the structural elements/ members on nearby existing structures.
- ☀ Explore ways for the art program or creative design elements to add community ownership.

- ☀ Site OCS poles along the bridges in a rhythm that is visually pleasing and is complementary to the rhythm of other structural elements, while at the same time meeting all engineering requirements.
- ☀ Ensure that designs do not create any hazards, roosting areas, unwanted access, or negatively impact natural wildlife.
- ☀ Use materials, colors, and designs that support the values and design integrities of the stations, maintenance facility, and other project features.
- ☀ Take extra precautions to assure that pedestrians cross bridges only in designated locations.
- ☀ Review current maintenance programs on existing bridges and combine that with LRT maintenance practices to ensure that bridges are easy to maintain.
- ☀ Ensure that security fences support the design goals of the system identity.
- ☀ Create community and value-based design solutions rather than baseline load-bearing solutions to identify the LRT system.
- ☀ All designs should be reviewed to confirm that they will not attract undesirable use.

Additional Town Lake Bridge criteria

- ☀ Ensure that design of the LRT bridge and touchdowns add value to the Rio Salado Park. Explore opportunities to provide infrastructure for shade structures, rest rooms, storage areas, and landscaping.
- ☀ Bridge lighting on the two existing Mill Avenue Bridges are a point of community pride. Strive to make



lighting for the LRT bridge unique yet not something that overpowers the existing lighting of the park or the Bridges.

- ☀ The design should have as little visual impact on the existing railroad bridge as possible.
- ☀ Design the bridge as an attractive shade structure for lake boaters and recreationists.

Additional Central Avenue Bridge Modifications criteria

- ☀ Design structural work required to accommodate the LRT system to have no visual impact on the upper side of the bridge and minimal visual impact on the underside. If significant structural modifications must be made, design to ensure that visual continuity is maintained with the adjacent park and buildings such as the Library.
- ☀ Changes in bridge paving to accommodate track beds must match with the existing paving and curbs, or provide a distinct change in paving color or material to identify the track bed. Use of new colors should be consistent with the other colors of the bridge and the Central Avenue area.
- ☀ Design OCS elements to fit within the rhythm of the existing bridge.
- ☀ If affected replicate and replace existing decorative design elements.

Walls

- ☀ Design walls with details and surface textures to animate them in the region's sunlight.
- ☀ Provide wall textures that preclude climbing of surfaces and address concern for maintenance.
- ☀ Consider walls of stone, cast earth,

or cast concrete to create symbolic gestures that link the land and the built form.

- ☀ Consider the need to eliminate graffiti over the life of the system and coat surfaces with a clear graffiti proof treatment or utilize paint colors and zones that will be easily maintained.
- ☀ Design all walls with concern for how they will weather and gain natural character and patina.

Importance to User's Experience

Form: Medium

Bridges and walls can be highly visible elements and their mitigation sends a message of respect to the community.

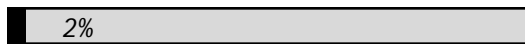
Function: Medium

While not related directly to the user's experience, bridges and walls are visually prominent structures needed to provide the desired LRT alignment.

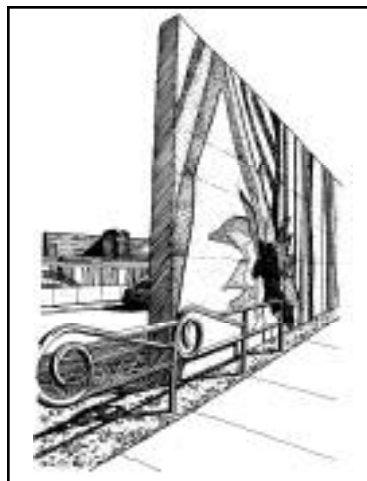
Cost



% of Overall Budget



% Urban Design Affects Element



Accentuate Surface Textures



ADA ACCESSIBILITY

The purpose of the Americans with Disabilities Act (ADA) is to ensure that all Americans, regardless of ability, have equal access to public facilities. The goal of this project is to not only meet the ADA Guidelines, but also to capture the spirit of the legislation, creating a system that has an easy continuity of experience for persons in wheelchairs (both those with full range of arm motion and those who have little or no arm motion), those with varying degrees of sight, persons with limited or no hearing, parents with baby strollers, persons with walkers, or even people on crutches.

The system should be holistic and fully integrated in its approach to ADA design. System designers, civil engineers and architects must think about the experience of a whole trip for people of all abilities, and produce design responses accordingly. An ADA task force will be formed that will work with the project team to determine appropriate, region-specific solutions. The issues identified by this group should inform the design of all aspects of the project.

Urban Design Performance Criteria

- ☀ Meet or exceed all standards prescribed in the Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG).
- ☀ Design and implement wayfinding elements to connect bus transfer facilities and community facilities with LRT stations.
- ☀ Assure that pedestrian-controlled traffic signals and time cycles at intersections approaching the station conform to or exceed ADA standards.
- ☀ Locate vehicle stop bars at all LRT and traffic intersections to ensure that vehicles will stop well clear of the pedestrian crosswalks and ADA ramps. Vision-impaired users typically prefer to negotiate curbs rather than wheelchair ramps, so the option should be provided to access the crosswalk via a curb location or a wheelchair ramp.
- ☀ Design ADA wheelchair ramps at intersections to provide a smooth, uninterrupted connection from street level to station platforms. Design ramps to have less than 5% slopes to avoid railings.
- ☀ Integrate accessible paths into primary pedestrian pathways rather than providing separated routes.
- ☀ Assure that uncluttered pathways are maintained by keeping furniture, newspaper boxes, bike parking facilities, and other elements clear of pedestrian and ADA traffic flow requirements.
- ☀ Locate all information and wayfinding devices in a well-marked, easily accessible and similar location in each station.
- ☀ Provide information for all members of the ADA community at LRT stations. Include large print and Braille systems enhanced with audible systems on signage and information facilities wherever possible.
- ☀ Provide visual and audible systems, such as blinking lights or auditory announcements, on station platforms to announce arriving trains.
- ☀ Design LRT ADA facilities to avoid the need for station-based mechanical lifts.
- ☀ Provide ADA 911 emergency access telephones at key areas of the system, including LRT stations and park-and-rides. Provide phones with volume controls and at least one text telephone unit. Phones

should be easily accessible and their presence announced by both visual and audible methods.

- ☀ Create changes in texture which adequately and distinctly announce to the user decisions points, information boards, waiting zones, and vehicle-boarding zone.
- ☀ Design all project paving with the understanding that wheelchair users prefer smooth paving while respecting the use of texture that may serve as a tactile clue for persons with sight impairment or blindness.
- ☀ Provide tactile warning strips, in contrasting colors from adjacent paving, along edges of station platforms and at both edges of trackbeds at all intersecting pedestrian crosswalks.



Tactile Strip on Side Platform



Wheelchair Ramp to Station

Importance to User's Experience

Form: Moderate

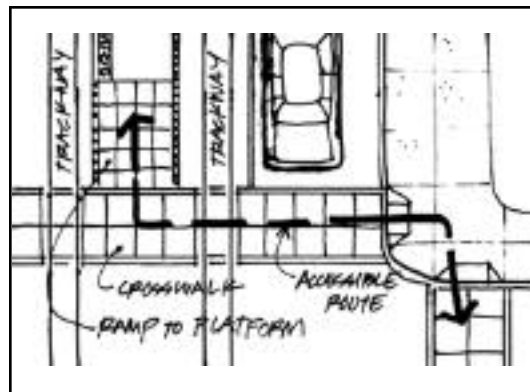
Aesthetic integration of ADA facilities is desirable.

Function: High

ADA facilities are mandatory components of the system and provide service to all individuals of society.

Cost

Negligible



Accessible Path to Platform



STATION
AREA
FEATURES



STATIONS

Stations need to function as good social environments, as well as function as safe and logical spaces. They need to accommodate a wide range of users from children to the elderly, from persons with all levels of abilities, and from the single individual to very large crowds.

Landscape, security, signage, public art, furnishings, architecture, and shading elements play inter-related roles in creating an attractive, comfortable pedestrian environment on the station platform. Furthermore, they create a territorial demarcation of where the system ends and the identity of the neighborhood begins.

Potential uses for the station include: boarding or disembarking the train, buying tickets, planning the journey or continuing the journey by bus, locking up a bicycle, sitting or leaning against station furniture, pondering the art within the station, finding shelter from monsoon rains under a station canopy or relief from the blazing summer heat under trees or shade structures, or even throwing away food wrappers or drink containers.

The platform, or the waiting surface on which a rider stands, will be approximately 12-16 feet wide and 300 feet long. This hardscape will see more use than any other element within the system. Not only will it perform as a visual cue on the landscape, but will also be continuously present within the user's field of vision whether waiting at the platform or riding the vehicle and arriving at the station.

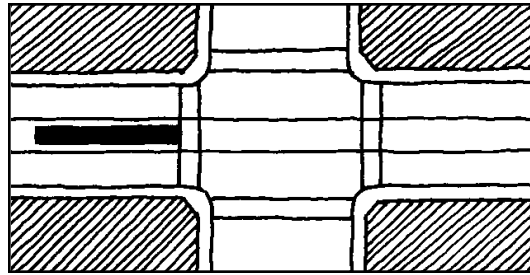
Ensure that the station design process keeps passenger comfort and security in mind while exploring a station aesthetic that is progressive and reflects the system identity.

Urban Design Performance Criteria

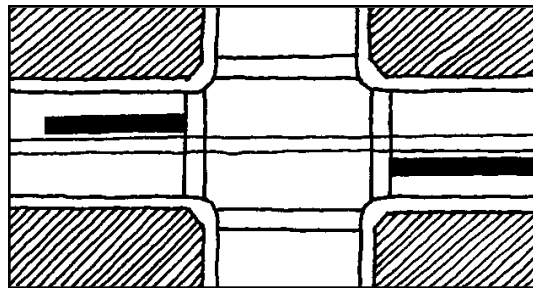
Architecture

- ☀ The primary visual expression of the station architecture should provide a direct functional expression of the system-wide identity.
- ☀ Shade and canopy features should be designed to maximize the functional sheltering capability and the visual delight of the beholder.
- ☀ The station aesthetic should bear in mind the fact that the platforms will act as an oasis from the heat and passing traffic as passengers wait for the train.
- ☀ Remember that the station will need to provide visual interest for not only the first time rider, but also for the daily commuter.
- ☀ Design the station to accommodate maximum potential use calculated from ridership projections, while also providing an environment that is safe and functional for the single rider.
- ☀ All potential design hazards must be eliminated from architectural forms and furnishings, such as sharp edges or poorly finished welds. Protruding elements should be avoided that could be a tripping or snagging hazard.
- ☀ All materials should be durable, easily maintained, and vandal-resistant.
- ☀ Exceed ADA requirements, wherever possible, in providing sufficient maneuvering space, surfaces, and accommodations for wheelchairs, bicycles, strollers, and walkers utilized by the elderly and the sight impaired.

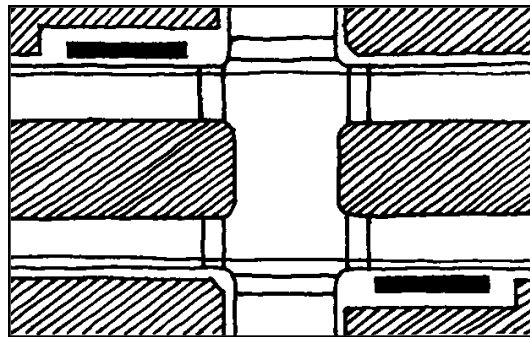
- ☀ Provide access ramps with less than 5% slopes onto station platforms where possible.
- ☀ Maintain a clear, logical, and accessible path from the platform entry to the vehicle- boarding location.
- ☀ Optimize visibility of pedestrians as they enter a station area and proceed to the platform.
- ☀ Fully integrate side platform functions into existing surrounding sidewalk and/or pedestrian plaza without obstructing pedestrian flow along circulation portion of sidewalk.
- ☀ Colors, materials and finishes should be light and heat reflective, rather than heat absorptive.
- ☀ Design station and station area to be compliant with CPTED (crime prevention through environmental design) principles (see Security section).
- ☀ Encourage station designers to look at the circulation issues at each station through the eyes of a pedestrian, a biker, a bus transfer, and a person with disabilities. Each mobility has its own path. Seek to ensure that these paths are not detrimental to each other.
- ☀ Provide 60% shading for the platform during the hours of ten a.m. to two P.M.



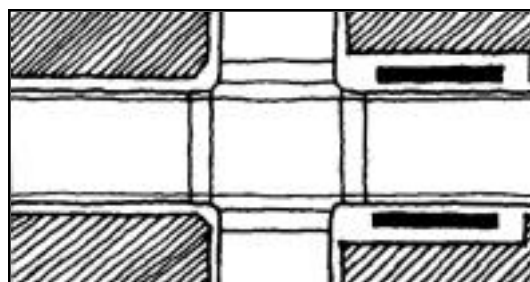
Median Condition - Single Platform



Median Condition - Split Platform



Side Condition - One-Way Couplet



Side Condition - Split Platform



Furnishings

- ☀ Investigate the potential for custom designed furniture to meet the climactic needs and provide rider comfort.
- ☀ Furnishings should be bolt down (with vandal proof connections) to allow replacement and flexibility.
- ☀ Furnishings should reflect a modern, progressive, "timeless" design vocabulary consistent with the theme of the LRT system.
- ☀ The station should provide seating options for 30 persons under cover (both shaded and rain-protected). This should include a range of seating and leaning rail options. It should also allow persons to sit alone or with a group, under total or partial shade (such as from a tree).
- ☀ Use the results of the shade analyses to place seating (including spaces for persons with wheelchairs) so that at least 50%:
 - a. are in full shade for all sunlit hours from March 21st through September 21st; and
 - b. are under cover for rain protection.
- ☀ Colors of furnishings must be consistent with the overall LRT system color palette.
- ☀ Trash receptacles should be cylindrical rather than square in order to minimize the appearance of bulk.
- ☀ Ticket vending machines should be easily identified, of consistent design and location, and conform to the system-wide aesthetic.
- ☀ Bicycle racks and lockers should be provided at each station's adja-

cent pedestrian area. The quantity of bike parking facilities should be determined on an individual basis for each station area.

- ☀ Provide consistently located public and emergency phones (one each) located centrally at each platform.
- ☀ Furnishings are for the use and comfort of system riders; design, layout, and locations should discourage unauthorized use.
- ☀ Avoid providing a canvas for graffiti or using surfaces that can be easily scratched, such as glass or non-textured stainless steel.

Paving

- ☀ Design pavement surfaces to be non-slip when wet, to be comfortable under foot, and to withstand heavy use and maintenance by power washing.
- ☀ Incorporate varied color and texture into pavement surfaces for visual interest and visual linkages to adjacent development and transit-oriented activities.
- ☀ Provide light colored paving, where possible, to reduce heat absorption/ retention from the sun.
- ☀ Provide color variety and a generally finer grain of detail and jointing in pedestrian paving, to achieve a more human scale with the material.
- ☀ Provide design continuity in paving patterns, colors, and materials from station platform paving onto adjacent sidewalks, plazas, and pedestrian crosswalks and throughout station area zones in general.



Importance to Users Experience

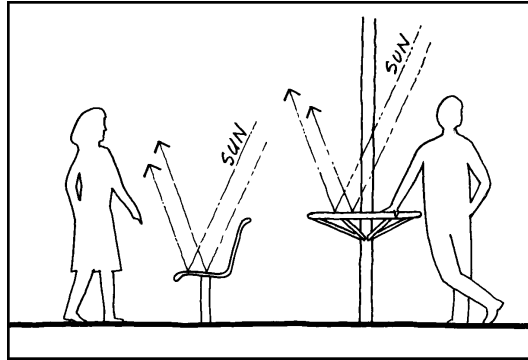
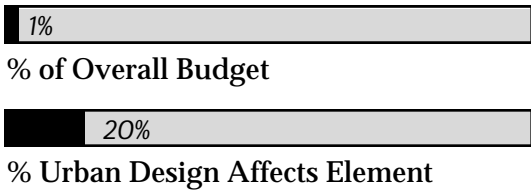
Form: High

The appearance of the station will significantly effect the user's perception of the image and quality of the system.

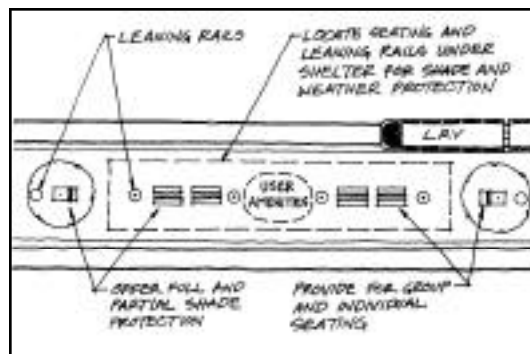
Function: High

Station must function to provide a comfortable, easy-to-use, and positive experience for the user. These elements will be touched and heavily used by the LRT patrons, and the success of the system will depend on well functioning furnishings. These will be second in importance only to the functioning of the LRT vehicles.

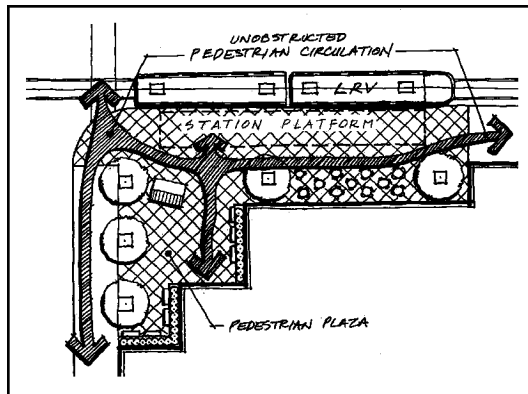
Cost



Light and Heat Reflective Furnishings



Range of Seating and Shade Options



Integrate Side Platform with Adjacent Land Use



SHADE AND COOLING DEVICES

In the Valley, people's outdoor decision-making revolves around the intensity of sunlight and the heat it produces. Our automobiles, our back yards, our sports facilities and our walking distances to the market, our schools and the bus are designed and organized around our heat tolerance during any given day. To ignore this very real aspect of life in the Valley is to render the transit system dysfunctional before it opens.

Approaches to mitigate the detrimental affects of the sun/heat to the ridership could include, but will not be limited to:

- ☀ station shelters and screens designed to create shade during key solar angles,
- ☀ streetscape elements such as trellises, vertical screens, and horizontal screens,
- ☀ existing buildings or the configuration of new buildings which can be employed in shadow casting or the inclusion of arcades,
- ☀ unique archetypes such as tents, canopies, or ramadas,
- ☀ materials or configuration of construction processes which employ advanced cooling strategies such as tensile fabrics, lath lattices, or perforated metals
- ☀ and landscape materials strategically placed throughout the pedestrian circulation and queuing areas.

Shade, together with cooling strategies, may be the two most important elements in regards to the successful functioning and marketing of the system. In the desert climate, it is crucial that multiple strategies be employed to protect the rider's comfort, including the completion of a sun angle analysis at every station location and the incorporation of the results into station design.

Traditional single canopy transit solutions will not provide the required amount of shade without the addition of vertical shade elements, adjacent buildings, or other shade structures.

Urban Design Performance Criteria

- ☀ Develop shading systems to assure shaded conditions occur wherever pedestrians / transit users congregate while waiting for the train, by:
 - making use of existing shade devices such as buildings, architectural features or trees, and/or
 - providing appropriately designed and well-sited shade devices.
- ☀ Design vertical shade screens to blend appropriately with station architecture and site the screen so as to fit contextually with adjacent land uses.
- ☀ Provide design solutions that reflect system-wide commitment to a progressive expression of the community's spirit.
- ☀ Use shade devices with other elements to define station area's image within the neighborhood and to celebrate region's uniqueness.
- ☀ Site vertical sun screens within station areas to avoid negative impacts on adjacent businesses, residences, right of way circulation, and land uses (both current and anticipated). fit within the system aesthetic of color and materials yet take into consideration immediate community identity and scale, and take extra precautions so as to not create blind spots or forms that violate CPTED principles.
- ☀ Optimize shading solutions for all sunlit hours in response to the solar orientation from March 21 through



September 21. For specific sun angle requirements, see “Climate, Comfort and Health” Report.

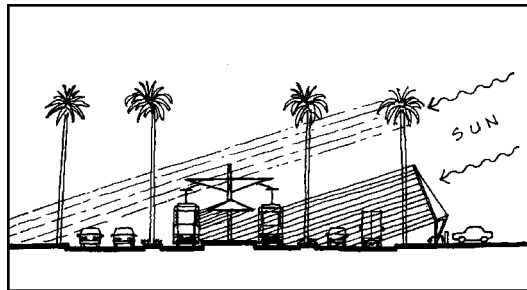
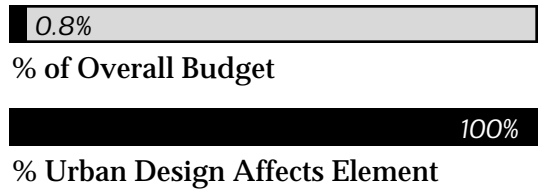
- ☀ Create shading system that recognizes primacy of canopies on Station Platforms.
- ☀ Provide areas of partial shadow in addition to areas of full shade.
- ☀ Explore opportunities for shading devices to interact with pavement and lighting to project changing patterns of light, shadow, and color images throughout the day and seasonally.
- ☀ Design shading systems, to the extent possible, to allow solar penetration to pedestrian areas during the winter months.
- ☀ Take advantage of unique opportunities for fully integrated artist/ architect/ engineer collaboration.
- ☀ Utilize materials that are low-maintenance, which minimize impact of dust and wind driven trash, and are rugged under windy conditions.
- ☀ Design shade elements appropriately to be vandal resistant and to be inaccessible to climbing.
- ☀ Incorporate cooling devices according to the recommendations of the “Climate, Comfort and Health” Report.

Importance to User' s Experience

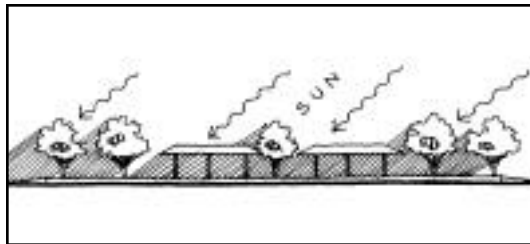
Form: High
Shading elements will be a highly visible part of the design vocabulary of overall system.

Function: High
Devices are critical to enabling / encouraging use of the system during summer months.

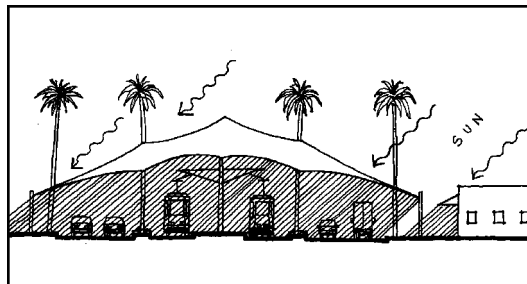
Cost



Vertical Screens



Shade Trees and Shelters



Buildings and Architectural Features



ADJACENT PEDESTRIAN AREAS

These variable sized right-of-way elements will serve as the connective tissue between neighborhoods and stations.

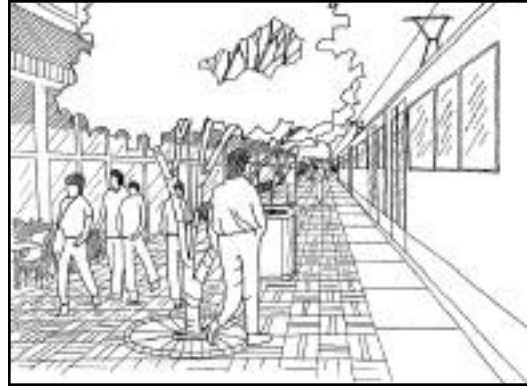
These public spaces may be created by altered rights-of-way. In other locations, they may be an existing building frontages. They could also be formed by the organization of an adjacent park-and-ride. Regardless of their inception, they must function as a successful urban place. Tools that could be employed to enhance these spaces are public art, furniture, lighting, landscaping, and partnerships with existing or future adjacent developments. Obviously extra care should be used to ensure that they provide good circulation, good security practices such as “eyes on the street”, are easily and routinely maintained, as well as become a value-added amenity within the neighborhood.

Where possible, these areas should provide a seamless connection between the neighborhoods and the station platforms. The amenities provided should reflect the individual requirements of each location yet maintain an equitable level throughout the system. Design of the adjacent pedestrian areas should be created in conjunction with city and neighborhood planning processes as part of the station design process.

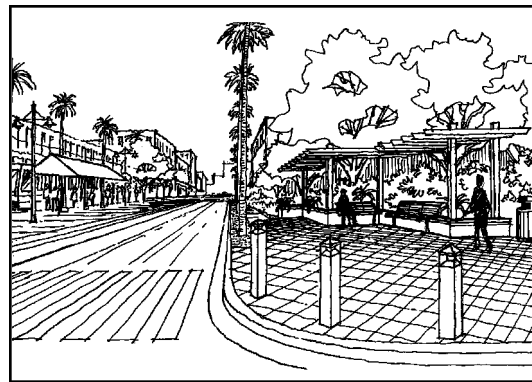
Urban Design Performance Criteria

- ☀ Create places compatible with the design of adjacent stations in the use of colors, forms, furnishings, materials, signage, lighting, etc.
- ☀ Clearly define pedestrian flow paths of sufficient size to the station platforms.
- ☀ Design spaces to accommodate and respect all members of society.
- ☀ Where possible, extend paving, planting, and lighting designs outward to a logical conclusion at edges of buildings, inter-related multi-modal transfer facilities, kiss and ride, and park-and-ride locations, and edges of adjoining neighborhoods.
- ☀ Design the areas as park-like “oasis” spaces, when possible. Provide distinctive, interesting, decorative plantings, public art, drinking fountains, and “sociability” opportunities.
- ☀ Provide as much shade as possible.
- ☀ Design side platforms and adjacent activity areas in concert so that they are mutually supportive spaces.
- ☀ When possible, accommodate linkages to existing community amenities and activity spaces.
- ☀ Work with cities to provide as much seating as appropriate, including public cafe tables and chairs, ergonomically comfortable benches, and seat walls to encourage use by all members of the community, including non-LRT patrons.
- ☀ Anticipate the possibility for outdoor performers, food and other vendors, etc. to enliven the use of the spaces with diverse activities by creating a sense of scale and providing power hookups.
- ☀ Provide newspaper “condominium” enclosures for individual boxes to prevent undesirable ad hoc arrangements of boxes throughout the streetscape.
- ☀ Provide sufficient and attractive bicycle parking and storage facilities in logical locations to prevent ad hoc attachment of bicycles to trees, poles, etc.
- ☀ Accommodate vertical sunscreens for adjacent station platforms as possible.

- ☀ Utilize vandal resistant materials that are easy to clean and maintain, and will reflect an image of a well maintained urban space.
- ☀ Ensure that the public agency commits to a maintenance program for these rights of ways.
- ☀ Look for open space development opportunities in property takes and provide community enhancements through public art, landscaping, and urban amenities.
- ☀ Provide appropriate system wayfinding and information signage as well as community based kiosks when possible or appropriate.
- ☀ Take extra care to follow CPTED security principles in the designs of these areas.
- ☀ Within the station area design process, designers will enlist area stakeholders to help determine appropriate neighborhood-specific solutions to the creation of these spaces.



Waiting Area for Side Platform Condition



Waiting Area as Expansion of Sidewalk for Pedestrians Waiting to Cross Street to Center Platform



Waiting Area Designed as a Destination Plaza Aspect of the Urban Fabric

Importance to User's Experience

Form: High

Spatial form of pedestrian waiting areas has a great influence on the comfort and enjoyment of the user's experience.

Function: High

The function of adjacent pedestrian areas is critical to the user's experience; that is, the comfort, enjoyment, and continued use of the LRT system.

Cost

Not in Typical Light Rail Budget



BUS AND BIKE CONNECTIONS

Bus and bike connections are the pedestrian routes and urban places designed to facilitate and encourage transfers between buses, bike routes and the light rail system. The goal in the design of these spaces is to create a seamless, safe journey between the systems, providing minimum walking distances and maximum convenience and comfort to users.

We, as designers and administrators, must never lose sight of the fact that the partnership between buses and LRVs is a critical foundation. While there will be a unique identity to the LRT, it will also function as a subsidiary piece of the overall regional transit identity that is experienced as one by the public.

The flat topography, the wide boulevards, and the Valley's lifestyle have all been contributors to an ever-increasing bicycle friendly environment. Families, university students, and commuters are all part of this active transit community. As the bus fleet has been equipped with bike carrying capacity, more and more bicyclists are making use of bus and bike partnerships. As light rail comes to the Valley, it only makes sense that the community will take full advantage of the system, whether it occurs during the workweek or weekend, daytime or evening. This specialized ridership can be creative in their use of transit and inspire current non-riders through their enthusiasm. In turn, the rail system should do everything within reason to enhance their journey and complement their needs.

Urban Design Performance Criteria

Bus Stops

- ☀ Work with the bus operations staff of each city to maintain or relocate bus stops in relation to the intersection (near-side or far-side) in order to decrease walking distance and street crossings and to provide the best

waiting experience for bus passengers transferring to the LRT system. Consider the adjacent land use and shade opportunities when determining the location with the best waiting experience.

- ☀ Design each system of station locations to produce the minimal number of street crossings for the rider.
- ☀ Work with adjacent property owners to minimize the number of overly wide driveways between the bus stops and station to provide more secure pedestrian routes.
- ☀ Seek to provide direct lines of sight between LRT stations and bus stops.
- ☀ Take into account projected pedestrian flows between buses and LRT vehicles in determining walkway widths.
- ☀ When possible, provide shaded walkway connections between LRT and bus stops, by using shade trees and/or shade structures.
- ☀ Encourage bus operations staff to consider upgrading of site furnishings at adjacent bus stops and relocation of existing shelters to other stops within the bus system. Try to integrate landscape treatments at adjacent bus stops and along connections to LRT stations.
- ☀ Provide design continuity in paving patterns, colors, and materials in all improvements to bus stop areas in conjunction with LRT stations.
- ☀ Explore the placement of drinking fountains, telephones or other community features at adjacent bus stops.
- ☀ Explore the design opportunities for developing shared adjacent pedestrian areas.



Transit Centers

- ☀ Design transit centers as good public urban spaces with direct access between the bus bays and the LRT station. Provide cross-platform connections between bus bays and the LRT station whenever possible.
- ☀ Create transit centers that reflect design continuity with rail urban design elements.
- ☀ Design transit centers to be within easy and convenient walking distance from park-and-rides, where applicable.
- ☀ Strive to establish transit center programs that include mixed-use elements providing information, rider conveniences, and complementary office or retail uses.

Bike

- ☀ Work with the cities and the biking community to link transit stations to existing and future bike facilities.
- ☀ When designing paved surfaces (trackway, ADA paths, sidewalks), make sure that they are skid-resistant and easy for bikes to cross.
- ☀ Investigate opportunities to develop a signage program that places directions at trail heads indicating best route to reach the closest train station.
- ☀ Develop accurate projections for the number of bike lockers and bike racks for all station locations. Pay special attention to night/day/week-end and special events fluctuations.
- ☀ Work with adjacent developments, both existing and future, to partner in the joint siting of bike racks and lockers.
- ☀ Site bike racks and lockers in “eyes on the bikes” conditions.

- ☀ Investigate development of LRVs without seating or include flip-up seating to facilitate the transport of large biking crowds at peak times.
- ☀ At highest use bike locations, explore the creation of a bike station, which could include a staffed information and maintenance kiosk, coffee and refreshments, multi-level bike racks, and biking bulletin boards.

Importance to User's Experience

Form: Medium

The creation of a high quality aesthetic character in these areas is important to the overall image of the LRT system.

Function: High

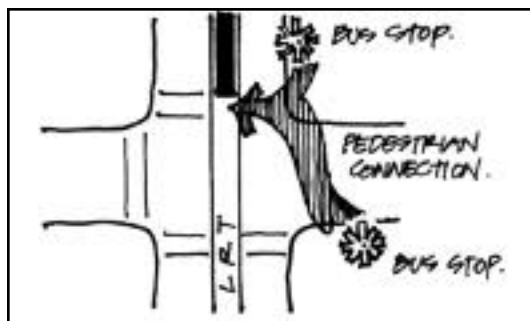
Highly efficient, comfortable and convenient intermodal transfer connections between buses, bikes and LRT vehicles are vital to the success of the entire integrated system.

Cost

Not in Typical Light Rail Budget



Bus/LRT Interface



Pedestrian Connection/Bus Stop



PARK-AND-RIDES

Not only will passengers of the light rail system access the station by foot or by transfer from a bus; they will also pedal a bike or drive their car. At selected sites along the alignment provisions will be made for transit patrons to park their car for free and board the train. These parking lots are called park-and-rides. These facilities may take the form of small 50-100 space lots or multi-story lots holding 500-750 autos. Another function provided is kiss-and-rides, which provide a side bay for people to drop off passengers from an auto to access the light rail station.

Park-and-rides are the first experience for many riders of the system and so the design process should include a careful review of the pedestrian experience from the parking lot to the station. Special care should be taken to integrate the facility appropriately with the adjacent neighborhood.

Urban Design Performance Criteria

General

- ☀ Coordinate the planning and design of park-and-ride lots with adjacent transit-oriented development (TOD) improvements.
- ☀ Locate buildings with a pedestrian orientation in front of parking areas or on the first level of parking garages to buffer the view, while keeping view corridors open to the street.
- ☀ Work with cities to locate land uses adjacent to or on air rights above the park-and-ride facilities that will activate the mixed-use activity with the site and optimize shared-use opportunities for parking. Land uses with nighttime and/or weekend use might particularly benefit from a shared parking model.

- ☀ Explore pedestrian-oriented parking concepts in locations and layout of parking stalls and connecting walkways.
- ☀ Design park-and-rides to minimize traffic and noise impacts on the adjacent neighborhoods. Location of entry and exit drives should not encourage routes through the neighborhoods.
- ☀ Employ all design tools necessary to reduce the visual scale of the parking lots.
- ☀ Employ CPTED principles for surveillance and “eyes on the street” in designing parking lots that are as safe from criminal activity as possible. Install trees, hedges, shrubs and low screen walls with CPTED principles in mind.
- ☀ Provide light colored paving to reduce heat absorption/retention from the sun, avoiding asphalt paving to the greatest extent possible.
- ☀ Provide planted strips of shade trees between bays of parking, whenever possible.
- ☀ Investigate the potential for shade canopies to cover significant amounts of autos at each park-and-ride and the ability to market the weather-protected parking for carpools or other incentive programs.
- ☀ Investigate the potential to provide lighting through roof-mounted solar collectors.
- ☀ Provide clearly defined and appropriately located pedestrian collector walkways from parking lots to stations. Use special paving colors to help define walkways, as well as rows of shade trees (and vertical shade screens if necessary) adjacent to the walkways.



- ☀ Design parking lots with clearly defined vehicular flow routes, minimizing inefficiencies in flows and wait times, ensuring sufficient queuing distances before entering the public streets.
- ☀ Maximize clear and separate circulation for buses and autos within the facility.
- ☀ Provide ample facilities for parking and locking bicycles as close to stations as possible in the parking lots. Provide for expansion of bicycle parking in these locations.
- ☀ Provide ADA compatible parking spaces in the quantity and locations specified in ADA regulations.

Multi-Storyed

- ☀ When possible ground floor retail shall be incorporated into the structures. When the market will not support the development of such improvements the design of the ROW facing first floor shall be designed to receive retail in the future.
- ☀ Create clear, safe, and logical shaded pedestrian circulation paths within the structure as well as where they connect to transit stops.
- ☀ Use landscaping to create an enhanced urban amenity.
- ☀ Avoid designing blank walls or large expanses of unarticulated built forms. Provide a varied vocabulary of light and shadow as articulated in the overall systems identity.
- ☀ Provide clear, logical, easy to find points of egress for autos.
- ☀ Place elevators within exterior CPTED oriented locations.
- ☀ Keep well lit at night. Take extra pre-

cautions to direct lights away from adjacent uses which could be negatively impacted.

- ☀ Mitigate the visual presence of parked cars through screening or design elements.
- ☀ Design automobile entrance and exits so as not to negatively impact neighborhood circulation routes.

Importance to User's Experience

Form: Moderate

While not the most prominent elements within the system, park-and-ride facilities provide the first view and contact for many system riders.

Function: High

Station parking must be convenient and comfortable to the user to foster LRT ridership.

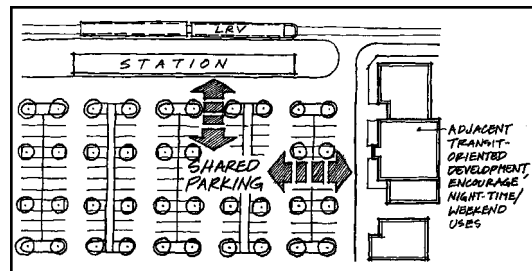
Cost



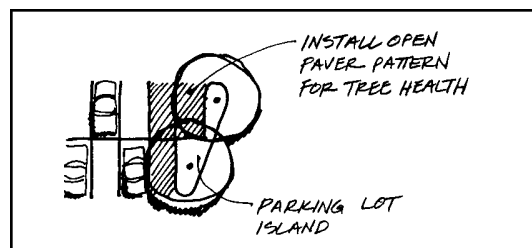
% of Overall Budget



% Urban Design Affects Element



Transit Oriented Development Parking Layouts



Typical Parking Lot Planter Island



LANDSCAPE

From the earliest settlements, landscape has provided a sense of oasis for desert cities. It has maintained an

important role for the people of this Valley, providing sustenance through crops and an expression of beauty and comfort. Now, as many people make their homes and livelihood in this region, plant life helps to renew a sense of this place by providing relief from the both the heat and the hard edges of the urban environment.

Roles that can be played by landscape include: screening of industrial uses, shading of station approaches and platforms, assistance in the demarcation of areas within the street as a series of outdoor rooms, and the framing of important vistas or landmarks along the corridor. It is paramount that the approach to landscape should play a major role within this system's identity, placemaking, and cooling strategies. For the above reasons, it is recommended that landscape should be incorporated as part of the system identity as well as an integrated part of the station design process.

Urban Design Performance Criteria

Landscape as Identity

- ☀ Use distinctive plant forms as landmarks at station locations.
- ☀ Choose plants that represent the local natural character and cultural history, and/or provide visual identity with special places along the corridor.
- ☀ Where feasible, provide an intensity of plant material immediately adjacent to the station, along connecting streets as well as along the corridor.
- ☀ Use landscape to help frame vistas to important mountain ranges or community icons adjacent to stations.

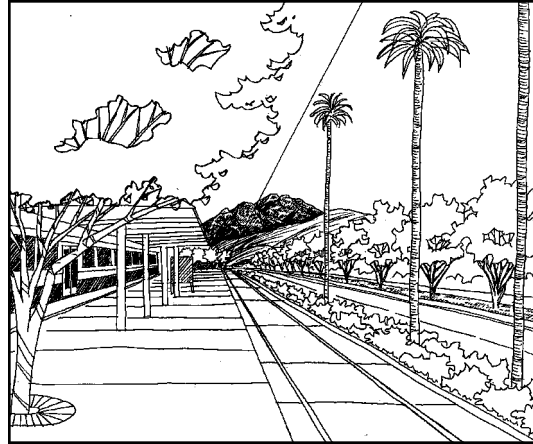
- ☀ Replace existing landscape medians in kind along the corridor so as not to lose landscape character.
- ☀ Use landscape in very wide streets or streets without pedestrian context to help identify the separation between pedestrian spaces and vehicular spaces.
- ☀ Minimize the removal of significant trees whenever possible.

Landscape as Function

- ☀ Understand that landscaping brings value to the transit environment even where shading is provided by other means because of its softening effect on the urban context.
- ☀ Provide a landscape window for visibility between groundcover and shrubs less than 2 feet and a tree canopy at greater than 7 feet.
- ☀ Evaluate sun angles and likely shade patterns from adjacent buildings and likely street tree locations to determine the best layout to achieve shading of the station platform and likely pedestrian routes to stations. Assist pedestrian routes with shade trees, where feasible.
- ☀ Place trees on the station platforms so that, when combined with the station canopy, they provide a range of full-shade, filtered shade and sunlight. A minimum of 36" box trees will ensure earlier shade.
- ☀ Seek partnerships with adjacent businesses and neighborhoods to promote landscaping or park areas in close proximity to stations.
- ☀ Consider seasonal and year-round color in the choice of plant palettes at stations.
- ☀ Use plant species that can survive in reflected heat conditions, such as native desert species.



- ☀ Provide the soil requirements that are necessary for trees to survive in the desert heat and urban conditions: minimum 48 square feet per tree and add structural soil at a minimum of 600 cubic feet per tree.
- ☀ Provide an automatic drip irrigation system to sustain all plant materials.
- ☀ Develop a proactive approach to landscape maintenance which includes irrigation line testing, proper horticultural management practices, and replacement of diseased plantings.



Framed Vistas from Station Platforms, Walks and LRVs

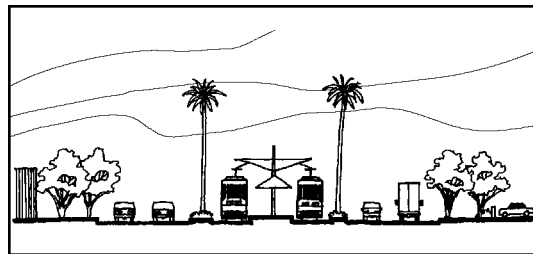
Importance to User's Experience

Form: High

- ☀ Provides aesthetic identity to system.
- ☀ "Oasis" appearance of concentrated plantings reinforces "good neighbor" relationship with community.

Function: High

- ☀ Provides shade, heat relief, and screening of visually difficult areas.
- % Urban Design Affects Element



Spatial Definition, Vertical Accents Visual Cues

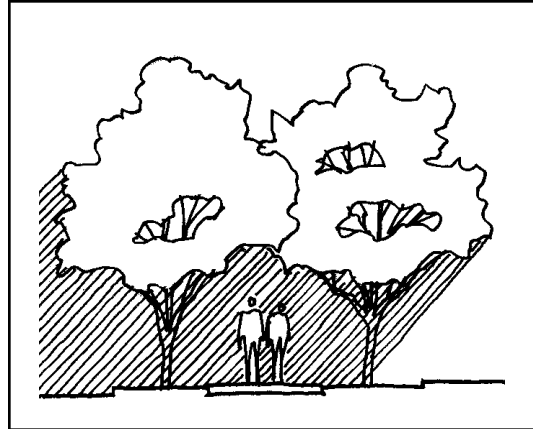
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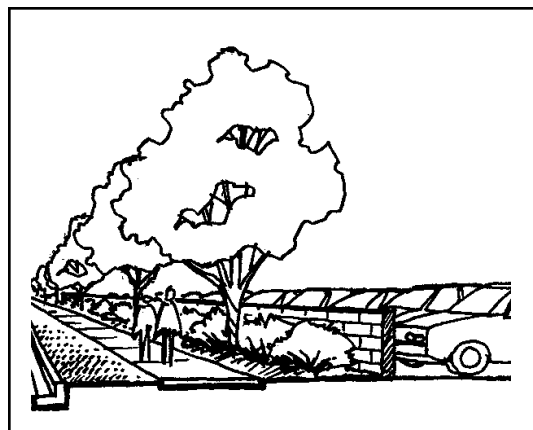
% of Overall Budget



% Urban Design Affects Element



Shaded Pedestrian Walk



Parking Lot Screening



ART

The opportunities for public art envisioned for this project include works commissioned or purchased by Valley Connections for stations, facilities, and rights of way affected by the construction of the light rail system.

Art works could be, but not be limited to; 1) landmark, “stand alone” sculptural objects, 2) collaborations between architects and artists which design unique forms of architecture or places, 3) artwork directly integrated into the system (paving, furniture, windscreens, bridge design, etc.) to bring another level of discovery to the rider’s experience, and 4) projects that have a high degree of community input and/or include the involvement of children to build neighborhood pride.

The Public Art Program has been identified by the RPTA as an integral part of the system, the rider’s experience of the system, the regional identity, and as a way of providing neighborhood identity. Therefore, some critical pieces of the Art Program include: the hiring of a Public Art Administrator to manage all program activities; the establishment of a Valley-wide Light Rail Public Art Committee to oversee all aspects and to ensure its regional nature; and the creation of project specific artist selection panels that include neighbors, stakeholders, and members of the Light Rail Public Art Committee.

Urban Design Performance Criteria

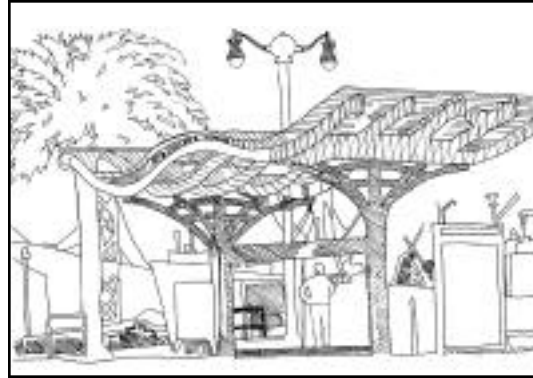
- ☼ Structure an art program and create specific projects that support and enhance aspirations of the Urban Design Guidelines.
- ☼ Establish a ‘big picture’ regional approach to the program with no specific style, theme, or media guiding the creation of the works. Leave it up to the artists selected, the internal agency review process, and the

regional based citizen art committees to determine the work that is undertaken.

- ☼ Work closely with the Public Art Staff from the cities of Mesa, Phoenix, and Tempe as well as the State of Arizona in the development of projects and the selection of artists so as to build on the foundation of their regional work and project review processes to date.
- ☼ Review and provide opportunities for comment on all art projects within the agency, at public/neighborhood meetings, and within the three jurisdictions formal design review processes.
- ☼ Solicit applications from local, regional, and national artists having past experience that relates to the scope of the project for which they are applying.
- ☼ Take extra care so as to solicit applications from diverse minorities where traditional application procedures are not effective.
- ☼ Create mentoring possibilities for semi or inexperienced local artists.
- ☼ Humanize the built environment through a sense of scale, wonder, touch, discovery and richness of materials.
- ☼ Create artwork that is respectful of its adjacencies, but not dictated by it.
- ☼ Assure that the art ultimately becomes a good partner to the transit system and the citizens it serves.
- ☼ Assure that works and designs are timeless and enduring in both materials and content.
- ☼ Create works that respond appropriately to the close proximity of the human touch.



- ☀ Assure that all art meets the rigorous demands of ADA compliance, maintenance, and other standard design criteria for this transit system.
- ☀ Extra precautions should be taken to ensure that public artwork integrity is not compromised by potential future decisions to add advertising to the system.



Collaborate with Architects and Engineers

Importance to Users Experience

Form: High

Injects the built environment with a sense of pride and ownership among local constituency.

Function: High

Brings meaning to place. Creates differentiation between neighborhoods and discourages vandalism.

Cost



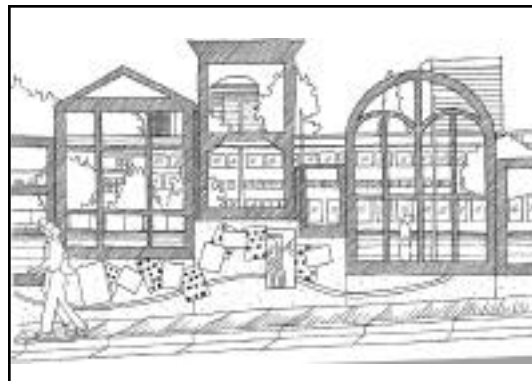
% of Overall Budget



% Urban Design Affects Element



Create Meaningful Places



Where Appropriate, Involve School Children to Build a Sense of Community Pride.



SIGNAGE

The visual appearance of the light rail system and its ease of use play an important role in creating an invitation to the first time user and expanding the use of the system to the seasoned rider. Effective signage is also critical in providing persons with disabilities or non-English speaking populations with access to the system.

The hierarchy of signs within transit systems are many. Wayfinding signs provide directional assistance to the transit station area and identification signs let the passenger know the name of the station. Information signs show passengers how to use the system, while regulatory and warning signs alert the user to various safety issues. Beyond static signs, Braille, audible sign devices, and electronic readerboards expand the range of information available to the rider.

It should be noted that every passenger will make use of numerous signage components on their journey and each sign must play an effective role. It is critical that the signage distinguish itself among a crowded landscape, yet not reflect dated or overly designed forms.

For these reasons, it has been determined that signage should be designed in a holistic manner, engaging the talents of a transit-experienced signage design firm, the RPTA marketing staff, and the architectural program.

Urban Design Performance Criteria

System Identity

- ☀️ Design a comprehensive signage corridor that effectively fosters a smooth-functioning, safe and easy-to-use system.
- ☀️ Partner with the regional group that is currently developing an overall regional transit identity that includes bus, bus rapid transit, express bus and rail systems to cre-

ate seamless, well-informed journeys.

- ☀️ Develop an LRT logo/graphic that will be distinctive, elegant, timeless, and immediately recognizable.
- ☀️ The LRT logo/graphic should be effective on signs, tickets, letterheads, maps, and when viewed in motion on moving trains.
- ☀️ The language of the signage should be able to communicate to both seasoned riders and new or potential riders of the system.
- ☀️ Design of signage should be consistent, visible, highly durable, vandal-resistant, easily maintained and should have easily obtainable replacement parts.
- ☀️ Ensure that ADA signage is given paramount consideration. Serve all members of the ADA community by coordinating this work with the Rail ADA Task Force and with City ADA commissions.
- ☀️ Signage should provide excellent visibility and high contrast during both day and night. Consider the fact that blue is a recessive color and that, for certain types of eye conditions, the colors red and green are not readable.
- ☀️ The LRT signage should be easily distinguished from other roadway and commercial signage.
- ☀️ System signage should make broad use of symbol-based graphics to assure quick ease of use by a diverse ridership.
- ☀️ Communication should be provided in both English and Spanish, since many of the Valley's population speak Spanish as their first language. Make use of international signage, where possible.



Wayfinding

- ☀ Direct pedestrians to stations from bus connections, park-and-ride lots, major neighborhood intersections, and key cultural, and recreational facilities.
- ☀ Provide signage that gives clear direction for an ADA accessible route.
- ☀ Direct patrons from their mode of choice to the stations: bicyclists from nearby bike routes and automobile drivers from park-and-ride facilities.
- ☀ Provide directional signs to emergency phones, and other rider conveniences.

Identification

- ☀ Identify each station by name and location. The names and/or signage of the stations should assist in easy recognition of the station location and nearby community facilities.
- ☀ Work with local transit agencies to identify the location of bus stops clearly from the light rail station.
- ☀ Identify station tracks and directional movements of trains.

Information

- ☀ Explore the inclusion of key cultural, or community facilities served by the LRT system. Study the potential locations of these signs and develop a rationale for their placement in station areas.
- ☀ Provide schedules, system maps, fare rates, and user instructions about the LRT system, to be located consistently at each station. The system should use automatic vehicle locating technology to provide accurate and up to date information on train arrivals.
- ☀ Provide information on connecting bus routes, frequency, destinations and direction of travel.

Regulatory and warning signage

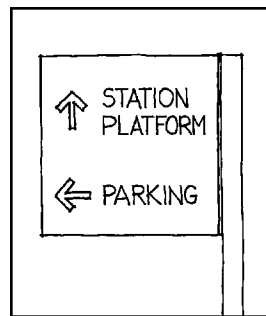
- ☀ Provide instructions about the use of parking lots, ADA parking spaces, prohibitions and regulations for uses on the LRT system, and vehicular (auto and bicycle) and pedestrian traffic regulatory information.
- ☀ Provide warning information regarding crossing or entrance onto LRT tracks and bridges.
- ☀ Carefully integrate regulatory and warning signage so as not to block other features.

Importance to Users Experience

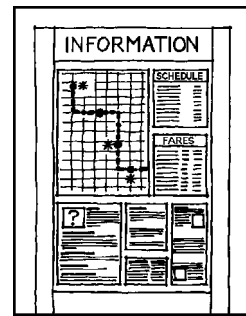
Form: High
 Important to the overall image of system.

Function: High
 Important to making the system easy to use, safe and perceived to be safe.

Cost
 Negligible



Directional Signage



Informational Signage



Identification Signage



Warning Signage



SECURITY

Often the perception that an urban site is safe is as important as creating a secure environment. Therefore the task of creating safe transit environments becomes a marriage of purely functional criteria with psychological solutions. In the Valley, Crime Prevention Through Environmental Design (OPTED) is a widely accepted method of designing urban spaces that eliminates visual barriers, provides highly visible security devices, and hidden devices that are used for surveillance. Strategic lighting should play a dominant role in the design of security features.

Beyond the basic OPTED philosophy, well-designed stations, the use of high quality (although practical) materials, and public art within the transit system give users and neighbors a sense of ownership and pride in their station. It is important to mention that maintenance plays a vital role in the actual deterrence of crime. When stations, system elements, artwork, or signage become vandalized or in need of repair, it calls into question the stability of the entire system.

It is paramount that design professionals work with the three jurisdictions' OPTED and/or police to ensure that security principles are well integrated into the station area and system design process.

Urban Design Performance Criteria

- ☀ Create a sense of a defined place within all transit areas, using specific paving, fences, railings, markers, lighting, signage, and/or art.
- ☀ Create clear and logical circulation routes and deter circulation in areas that could foster undesirable activities.
- ☀ Provide materials and finishes that will be easy to maintain or clean if attacked with graffiti or other vandalism.
- ☀ Avoid designing barriers such as shrubs, hedges or walls that can provide hiding places for criminals.
- ☀ Provide natural “eyes on the street” opportunities by opening up views from stations to adjacent community areas.
- ☀ Work to locate stations and adjacent pedestrian areas next to support activities (such as shops, actively used nighttime venues, recreation facilities, theaters, or hospitals), rather than in isolated areas.
- ☀ Keep the station platforms open and uncluttered by locating station furnishings in a way to maximize views through the area.
- ☀ Organize seating and waiting areas at stations so that people will feel comfortable and secure in the presence of other people and the station area environment.
- ☀ Provide at least two routes in and out of stations, whenever possible.
- ☀ Ensure that all public pay phones operate on a “call out” basis only.
- ☀ Provide highly visible and easily identified security cameras in tamper-resistant locations at stations and park-and-rides.
- ☀ Provide highly visible emergency 911 phones in the same location at each station and park-and-ride.
- ☀ Provide an appropriate level of nighttime lighting at stations, park-and-rides and adjacent pedestrian areas. The foot-candle rating should be dependent on site-specific conditions; care should be taken that pockets of light and dark do not provide hidden areas.

- ☀ Consider the opportunity to add police substations where the community is in need of increased police presence.
- ☀ Provide security reviews of all architecture, engineering, landscape and public art.

Importance to User's Experience

Form: High

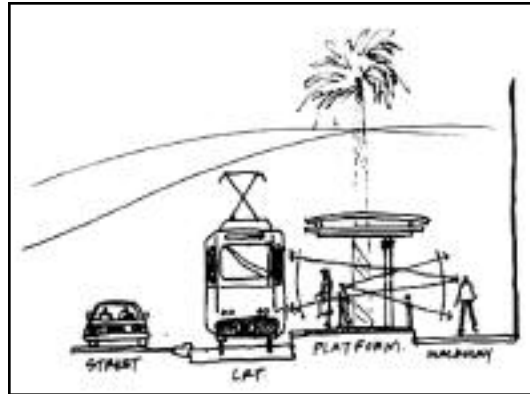
Creating a safe and reasonably secure public place is paramount to the user friendliness, fun and easy-to-use qualities of the LRT system. Physical surveillance equipment requires well-designed devices that are easily seen and that let the public know they are in a relatively safe environment.

Function: High

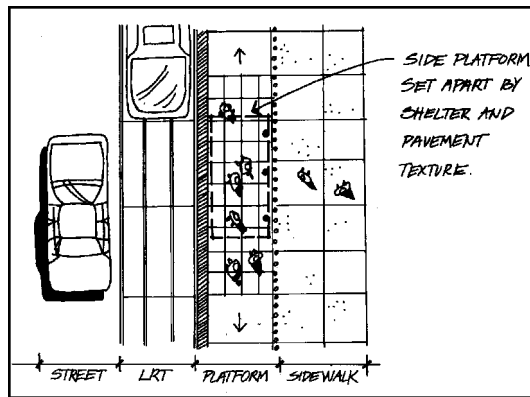
Design of all public spaces along the LRT corridor should provide for the safest and highest levels of use to occur during operating hours.

Cost

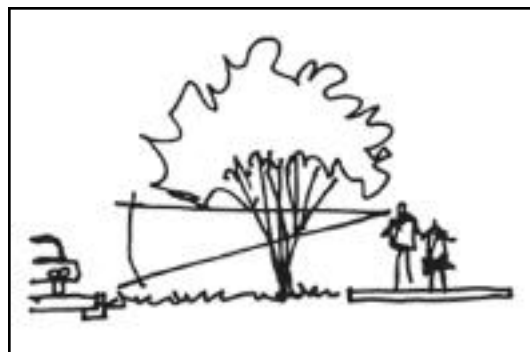
Negligible



Natural Surveillance from Side Platform



Well Defined Platform Area Boundary to Create Sense of Place



Landscape Window



LIGHTING

The clear desert night skies have often provided the impetus for Phoenicians to create their own magical lighting treatments. The lighting of the Mill Avenue Bridges, the wrapped palms in the Phoenix Civic Plaza, or the colored lights on the exterior of the Science Museum are but a few of such treatments which bring a sense of wonder to our cities. However, within transportation systems, we rely on light for other reasons besides magic; we rely on it for security, wayfinding, and connecting to places within neighborhoods.

While it is understood that the public will look to lighting to create consistent, secure means to navigate the light rail system, it should also be acknowledged that they will look for lighting to continue to create special nighttime places within their communities. Therefore, the architectural design process should include a lighting designer as part of the project team to ensure that lighting is integral, not an afterthought. It is further anticipated that a number of public art works could build on the concepts of lights in the desert.

Some of the lighting fixtures that will be included are street lighting, parking lot lights, station lights, security lights, bollards, and landscaping lights.

Urban Design Performance Criteria

- ☀ Meet or exceed minimum requirements for exterior light levels as specified by the Illuminating Engineering Society (IES) and follow local CPTED ordinances.
- ☀ Use lighting to provide a sense of scale and orientation.
- ☀ All lighting systems should be designed for ease of maintenance, energy-efficient operation, highest quality of light, and architectural compatibility with system-wide standards.

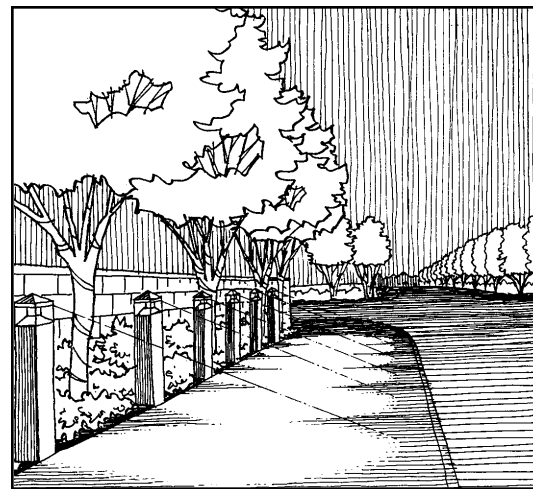
- ☀ Select fixture types based on high reliability and the availability of future replacement components. Parts must be readily available to maintenance crews so that lighting quality will be maintained.
- ☀ Site light fixtures in easy to maintain locations.
- ☀ Design station lighting to provide a welcoming approach to the station area and a warm ambience within the station itself.
- ☀ Look at light pole design during the OCS pole selection process to ensure that the design of the OCS pole and the design of the station light poles are integrated parts of the system identity.
- ☀ Avoid fixtures with minimal aesthetic qualities such as cobra heads.
- ☀ Evaluate OCS poles for use in attaching new light fixtures; minimize the introduction of additional light poles by using the OCS poles when possible.
- ☀ Evaluate the conditions of existing street lighting along the LRT route; if in-fill light fixtures are required, conform to the existing light pole architecture and lamp types; relocate and reuse existing fixtures when possible.
- ☀ Scale fixtures appropriately to canopies and the pedestrian level of activity.
- ☀ Minimize shadows and shadowy hiding places, but avoid excessive glare and light spillage into nearby homes and businesses.
- ☀ Provide designs having even and consistent levels of light for each type of system and location. Avoid too much light (hot spots) and too

little light (dark spots) in the spacing and arrangement of light fixtures.

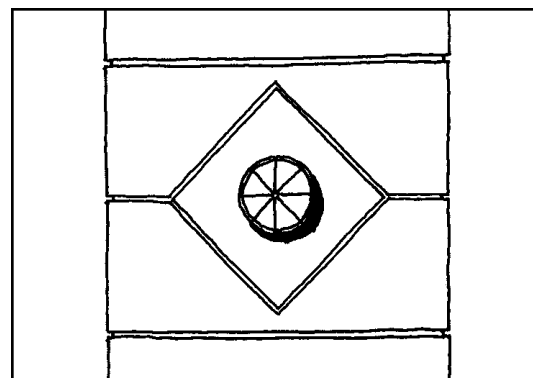
- ☀️ Employ dark sky principles; use accent lighting of landscape elements sparingly and appropriately.
- ☀️ Use unobtrusive full-cutoff luminaires to light park-and-rides and the maintenance and storage facility. Light these areas typically from the outer perimeter in, to minimize light spill beyond the edge of lots.
- ☀️ Utilize metal-halide lamps with ceramic arc tubes for a strong combination of color, life, and efficiency. Lamps should all be by the same manufacturer for ease of replacement and maintenance.



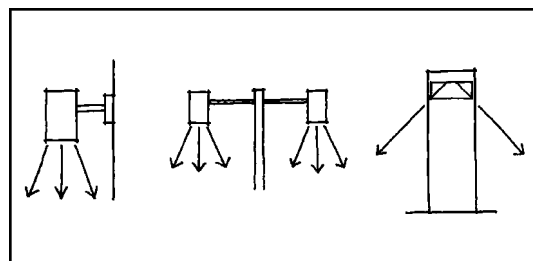
Safe, Pleasant Station Platform Pedestrian Area Lighting



Interesting Light and Shadow



Unique Character Accents



Develop a System of Fixture Designs that Relate to System Identity

Importance to Users Experience

Form: High

The appearance of lighting fixtures and the quality of light produced is very important to conveying a high quality image of the system.

Function: High

Lighting must function to provide a safe, secure, and convenient experience for the user, particularly when LRT patrons are on foot at stations, station areas, parking lots, etc. Night lighting is the first line of defense in supporting CPTED (Crime Prevention through Environmental Design) standards for safe, and secure public spaces.

Cost



% of Overall Budget



% Urban Design Affects Element



COMMUNITY FEATURES

The integration of the light rail into the existing community holds one of the greatest opportunities for the system. The best transportation systems not only serve the existing arenas, business centers and neighborhoods, they also create the potential to provide new community services as part of the transit experience.

Community Features may require coordinated actions from the light rail project team and city planning staff to integrate their design. A market analysis of each station area will determine which station areas can and should support the addition of transit-supportive land uses. The light rail team will assist the city planning staff in developing appropriate transit-oriented development zoning for the station areas with market potential. Those stations with the need for specific rider conveniences will be determined by a review with the community of actual needs.

Urban Design Performance Criteria

Mixed-Use Developments

- ☀ Identify existing, adjacent land uses for each station including cultural, educational, commercial, and recreational entities.
- ☀ Consider the thematic implications for station design based upon the nature of adjacent community features and facilities.
- ☀ Design and plan for appropriate development zones in station areas that have present or future market opportunities.
- ☀ Design station areas with direct lines-of-sight, convenient walking paths, and distances between community features and stations.
- ☀ Consider connections to existing buildings by the use of canopies

and arcades, or the development of community features within arcade connections.

- ☀ Work with the cities to facilitate adjacent land uses that provide multi-hour a day activity and pedestrian-oriented mixed-use in the station area, enhancing security and livability.

Rider Conveniences

- ☀ Pursue partnerships to create an extension of existing conveniences or introduce new conveniences into the design of the station platform, adjacent pedestrian areas, or bus connections. Examples include: satellite bank vending facilities, specialty coffee shops, sale or loan of magazines and books (library extension), video leasing/and or video return kiosks, the sale of arts/crafts/tools produced by students at local schools, sports-oriented collectibles at stadiums, museum artifacts, convention center displays, or entertainment ticket vending.
- ☀ Evaluate the character and potential of the station environment and user population in each case for the addition of these features. Make sure that the conveniences fit the actual need of the community for which they are proposed.
- ☀ Investigate the potential integration of uses that would tend to enhance security and eyes-on-the-street for park-and-ride areas, such as police sub-stations or community facilities with peak use on evenings or weekends.
- ☀ Look for opportunities to integrate rider conveniences within systems buildings to achieve design efficiencies.



Importance to User's Experience

Form: High

The creation of a high-quality aesthetic character in the station areas is vital to a successful LRT system image.

Function: High

Value added community features will greatly enhance the comfort and convenience of using the system.

Cost

Not in Typical Light Rail Budget



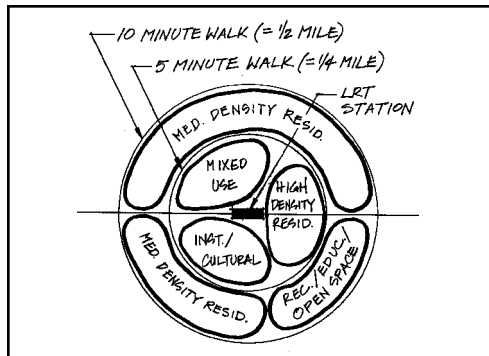
Residential Mixed-Use Oriented Toward Pedestrian Right-of-Way



Library or Other Community Services Integrated with Station



Transit Oriented Development with Integral LRT Station



Walking Distance



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