

DEPOT PARK

Reviving a Layered Landscape



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In 2013 I made the decision to leave the comfort of the job I had for the prior 7 years, and a career in GIS since 2003, and took a plunge into something new and different. Now that I am done with the program I've had a chance to reflect upon the program and my time in it. I can honestly say that I have no regrets and kick myself from time to time about not choosing this path sooner. However, I would have never been as successful as I was without the help everyone gave me along the way. From my professors seeing potential in me when I had doubts about my future in the program to the day my brother sat down with me and patiently taught me some Photoshop basics to help me keep up with Studio to all my MLA Candidate peers, past and present, who helped me when I needed it and asked for nothing in return -- the least I can say is thank you. I'd also like to thank my wife for dealing with all my ups and downs in the program and believing in me no matter what. She was my study buddy and the person I vented to when things were frustrating. I have no doubt I would not be where I am today without her support. I can't thank her enough.



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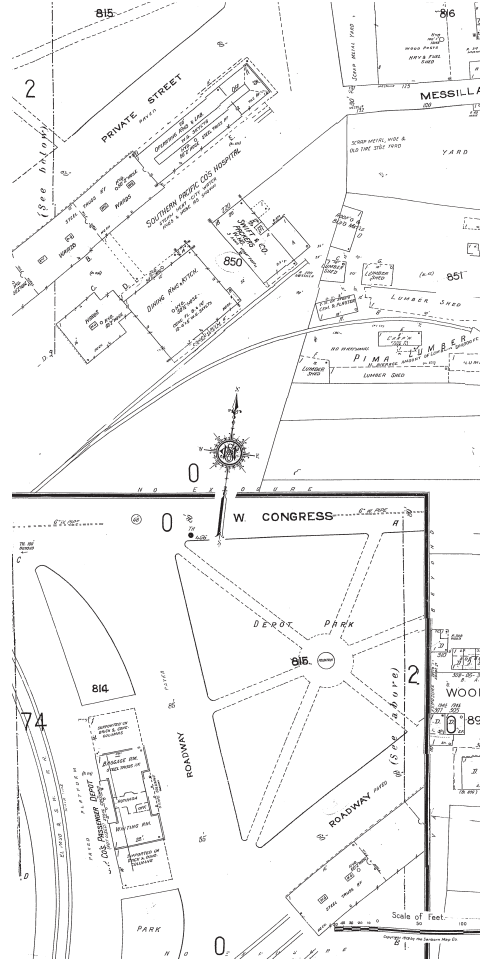
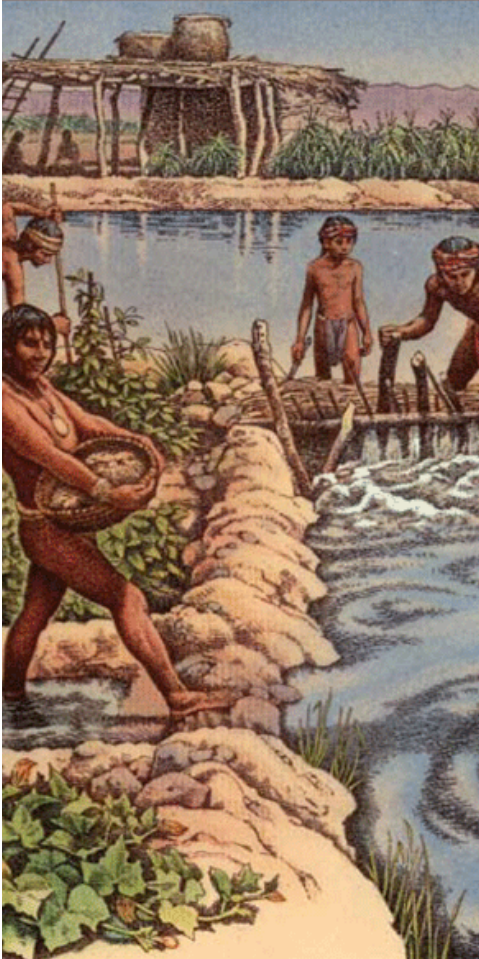
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ABSTRACT

As Tucson grows and its downtown is revitalized open spaces are quickly disappearing. The lack of open space downtown is partially due to the temporary closure of Viente de Agosto Park, the pending closure Jácome Plaza near the Main Library, and numerous development opportunities. Cities of all sizes seem to have a park that hosts events big and small and gives its residents a taste of nature in an urban environment. Many studies have shown that urban parks provide city residents social and psychological benefits while also having ecological and environmental services (Chiesura, p. 129). The goal of this project is to create an urban park for downtown Tucson that is capable of hosting events, festivals, or just lunch with a friend. The park will serve as a major stop along various established and planned routes. It will also be designed in a way that conserves water while using solar and wind technologies to reduce the need for already strained and increasingly expensive resources. To aid in the concepts and design GIS data, case reviews, and local regulations and ordinances will be explored.



INTRODUCTION

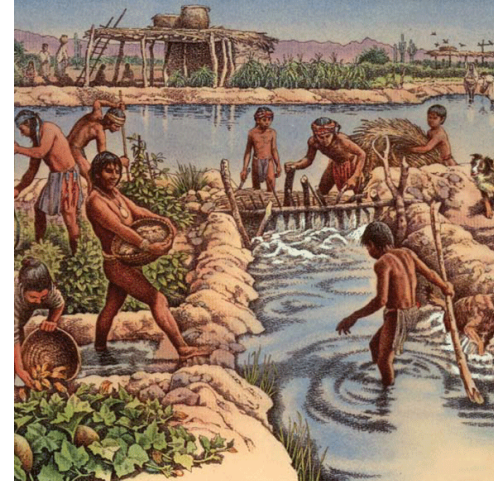


SITE HISTORY

Southern Arizona and Tucson have been inhabited continuously for the past 10,000 years making the region the oldest continuously inhabited place within the borders of the United States. From prehistory to protohistory to history the Hohokam, Piman, Sobaipuri, and Tohono O'odham all settled along the banks of the then flowing Híkdân, O'odham name for the Santa Cruz River (Seymour 81). Beginning in the 1500's Spanish explorers and missionaries arrived in southern Arizona and what is now Tucson, settling along the Santa Cruz much like the indigenous peoples. In 1775 Spanish soldiers founded the Presidio San Agustín del Tucson which at the time was part of Mexico until 1854 when Tucson came under the jurisdiction of the United States (City of Tucson 2014). Early on Tucson existed because of the Santa Cruz River. Its floodplains provided fertile farming while the water itself served as an irrigation source as well as a food source by providing fish that once lived in its waters.

Currently the Santa Cruz riverbed is about 20 feet below its banks and only flows during seasonal floods. This was not always the case. Until the late 1880's various peoples had successfully diverted water from the river through a series of acequias (irrigation ditches) to water their crops. In 1887 Samuel Hughes attempted to increase the amount of water, from the Santa Cruz, going to his fields which were located north of St. Mary's Road. Over the next four years, a series of large floods caused his ditch, and others, to downcut and quickly erode ultimately leading to what we see today. Most irrigation ditches were no longer viable and dried up because they now sat above high above the riverbed (Ballantyne "The Decline of the Santa Cruz River").

Until 1880 Tucson remained relatively small. After that time the railroad played a significant factor in shaping Tucson's future. The Southern Pacific Railroad brought in new residents from all over the United States and allowed a sizeable population of Chinese immigrants to flourish. The railroad allowed Tucson to grow exponentially thereafter by allowing for easy transport of goods and services to and from the city. Later, Tucson lobbied for an extension of the El Paso and Southwestern Railroad that would link the city to Fairbank, Arizona which today is a ghost town (SAGE Landscape Architecture & Environmental 122). With the new railroad line came an opulent railroad station which still exists today and is on the National Register of Historic Places. The El Paso and Southwestern Depot once featured lavish parks and fountains intended to be an escape from Tucson's summer heat and to demonstrate Tucson's growing wealth and importance (SAGE Landscape Architecture & Environmental 123). The station served Tucson from 1912 until 1924 when Phelps Dodge, who built the railroad, decided to focus on mining operations and sold the line to Southern Pacific who subsequently took the station out of commission. Since then the station has served as a sanatorium, restaurant, and offices (SAGE Landscape Architecture & Environmental 124).



Irrigation canal for crop irrigation
(Ballantyne "The Decline of the Santa Cruz River")



Congress Street Bridge 1915

South of the historic train depot was Barrio Membrillo. Until the late 1800's a historically Hispanic barrio existed on lands that stretched from the base of Sentinel Peak to land that the Tucson Convention Center sits on today (Jeffery). It resided on the floodplain of the Santa Cruz River and was named after the quince trees that grew there (Jeffery). More than half of the barrio was destroyed in the 1950's with the construction of Interstate 10 (Jeffery). Another large portion was destroyed during the 1960's during Urban Renewal efforts and the construction of the Tucson Convention Center (Jeffery). Today only 13 original homes still exist south of Cushing Street adjacent to the I-10 frontage road (Jeffery). Some of the Sonoran style adobe brick homes are now on the National Register of Historic Places which helps ensure their preservation and protection.

Since the push of urban renewal in the 1960's most of the three historic barrios were destroyed for the Tucson Convention Center and properties across Granada to the west that to this day still sit undeveloped. Decades of plans and ideas have come and gone and today other than the historic El Paso and Southwestern Railroad depot, railroad bed, and a temporary Greyhound bus station, most of the site is a barren wasteland of concrete and asphalt parking lots that are essentially used only during the Tucson Gem and Mineral Show.

Decades after urban renewal came to Tucson, the downtown area is finally showing signs of life. The renewal displaced approximately 1000 Tucson residents and removed sections of a historic barrio, including some 100 year old adobe structures, causing Tucson to lose some of its character and history. Some argue that if Tucson had a skid row, the west side of downtown was it. Many homes fell into disrepair and businesses sought better spaces outside of downtown as Tucson's population began to grow. The area that was drastically changed is still struggling 40 years later, even though new residents, students, and businesses are creating a vibrant downtown. Like many cities around the United States people are rethinking the type of living that can occur in the city centers. Because of upgrades to infrastructure, public transportation, dining and shopping options, as well as interest in living near these amenities, many urban cores are experiencing a resurgence in population. With this resurgence comes demand for new conveniences such as places to recreate.

While recreating history and bringing the barrio back to life is not realistic or economically feasible, creating a space on the edge of downtown Tucson that creates a sense of place and community is needed. Tucson hosts many festivals and events during the year because of the mild weather and climate. As cities expand, many downtown events seek larger venues as civic interest in them grows in the community. This project focuses on how to create a new larger venue, specifically an urban park, which will become an asset to the people, community, city, and region. This project also explores how to create a resilient urban park in an arid climate that can effectively meet the needs of today's urban dwellers.



El Paso & Southwestern Depot



All Souls Procession

STUDY PARAMETERS AND METHODS

RELEVANCE OF THE WORK

As Tucson grows and its downtown is revitalized open spaces are quickly disappearing. The lack of open space downtown is partially due to the temporary closure of Viente de Agosto Park, the pending closure Jácome Plaza near the Main Library, and numerous development opportunities. Cities of all sizes seem to have a park that host events big and small and gives its residents a taste of nature in an urban environment. Many studies have shown that urban parks provide city residents social and psychological benefits while also having ecological and environmental services (Chiesura, p. 129). The goal of this project is to create an urban park for downtown Tucson that is capable of hosting events, festivals, or just lunch with a friend. The park will serve as a major stop along various established and planned routes. It will also be designed in a way that conserves water while using solar and wind technologies to reduce the need for already strained and increasingly expensive resources.

RESEARCH QUESTIONS

How can an urban park in a revitalized downtown Tucson blend history, ecology, and sustainability? How can it respond to changing public needs and adapt to changes in climate?

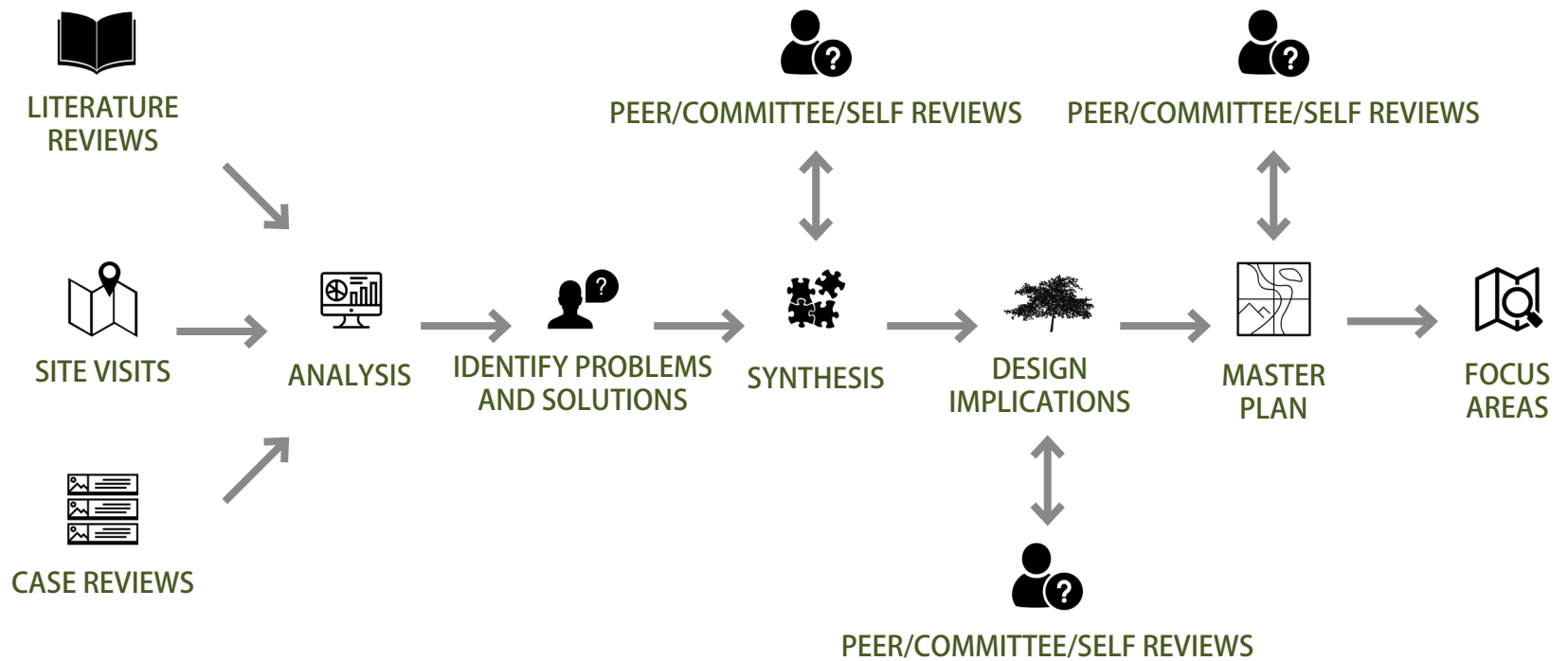
STUDY PARAMETERS AND METHODS

The site for my project is on the western edge of downtown Tucson, Arizona. The site itself is bordered by Interstate 10 and S. Freeway, W. Congress Street, and S. Granada Avenue. The site was chosen due to the ease of getting to the site via public transit, car, bus, bike, or simply walking to it along with the fact that green space in downtown Tucson is becoming sparse due to a renewed interest in downtown development and infill opportunities.

To aid in the creation of concepts and the final design case reviews, literature reviews, GIS data, site visits, and the performance of site inventories and analyses will all be taken into consideration. The literature reviews focused on the history, implementation, and best practices of both green infrastructure and low impact development. Case reviews focused on park history in the United States, park design, and what makes a modern urban park. They also focus on the restoration efforts with regard to natural, historic, and cultural restoration efforts. Finally, the case reviews focus on best practices in green infrastructure, low impact development, and sustainability as they relate to urban parks and how they balance use and function.

Site inventory was performed via site visits and photographically documenting drainage infrastructure and conditions, buildings on site, pedestrian and vehicular infrastructure, vegetation, and viewsheds from various vantage points. Using a combination of GIS data, from both the City of Tucson and Pima County, along with current and historic aerial photography a site analysis was performed. The site analysis mainly focuses on how people would get to the site, what the site is connected to, and what off-site amenities could be tapped into to create a successful urban park design. As part of the site analysis process decibel readings were taken at various periphery and interior sites using a Samsung Galaxy S6 Edge using the Sound Meter (v1.6.5a) application by Smart Tools.

RESEARCH PROCESS



LITERATURE REVIEW



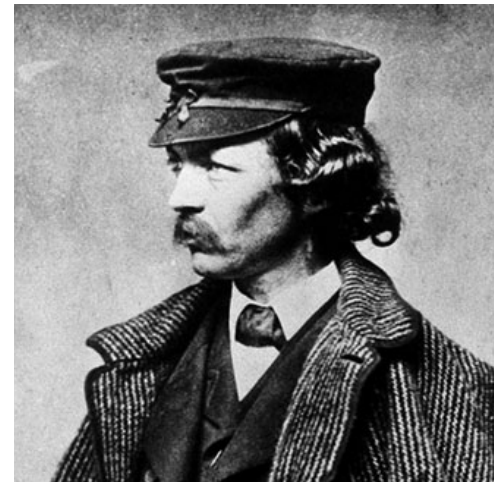
While the terms Green Infrastructure (GI) and Low Impact Development (LID) are often used interchangeably nowadays there are some distinctions between the two. GI includes a series of stormwater measures that “slow, capture, treat, infiltrate and/or store runoff at its source, and includes both structural (e.g. stormwater capture and treatment) and non-structural (e.g. preservation of open space) approaches (AridLID.org, 2010). LID is generally defined as a series of approaches and principles that minimize land disturbance during development, using and maintaining natural features in the development, and treating stormwater at the source rather than off site, and reducing imperviousness throughout the development in an effort to maintain the pre-development hydrology of the site (AridLID.org, 2010). GI and LID best practices are now an integral part of parks of all sizes. However, this was not always the case. Over time the functions of parks have changed in response to changing civic needs and today serve many human and stormwater infrastructure needs. Part of the park experience can be to learn about an areas history and culture, good or bad, but the challenge is what should be emphasized and what elements would build community and draw users. The literature review that follows explores these topics in greater depth.

GREEN INFRASTRUCTURE

GI uses vegetation, soils, and natural processes to manage water and create healthier urban environments (EPA, “What is Green Infrastructure?”). The approach protects, restores, or mimics the natural water cycle (American Rivers, “What Is Green Infrastructure”). It can be implemented at a variety of scales, and examples can be referenced at residential, city and county levels. Generally at the city level, especially in urbanized areas, GI is typically a network of natural areas that are used for habitat and flood control. On a smaller scale, such as a neighborhood or a project site, GI generally functions as flood mitigation and water harvesting techniques. Cities generally need as much GI as possible, given how dense and impermeable they tend to be (asla.org, “Green Infrastructure: Cities”).

As Frederick Law Olmsted Jr. once stated “No single park, no matter how large and how well designed, would provide citizens with the beneficial influences of nature; instead parks need to be linked to one another and to surrounding residential neighborhood.” (APA, “How Cities Use Parks for ... Green Infrastructure”). Until the creation of The Loop, many parks in the City of Tucson and Pima County were unconnected. Even with the addition of The Loop it is difficult to connect existing parks together via greenways because of the existing development patterns within the city. According to the American Planning Association (APA) “... linking parks, greenways, river corridors, and other natural or restored lands together to create an interconnected green space system provides far greater benefits for people, wildlife, and the economy. A network of parks can also provide pathways for wildlife moving from one isolated natural area to another (APA, “How Cities Use Parks for ... Green Infrastructure”). That being said efforts could be made to ensure that existing wash networks are maintained as wildlife corridors and possibly tapped for use as greenways to further connect our existing parks, especially within the city.

One area of Tucson that lacks a substantial amount of open space is downtown. Because of renewed interest in urban living, working, and entertainment, infill projects are quickly devouring most of the available open spaces downtown. This leaves new residents, students, and visitors few options for recreation and places that bring nature “close to home” (APA, “How Cities Use Parks for ... Green Infrastructure”).

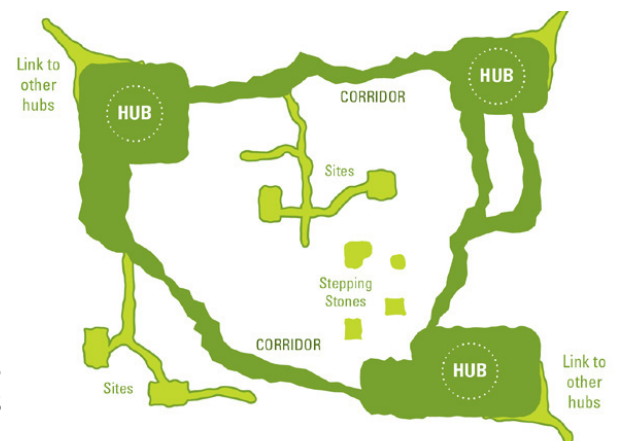


The need for a large tract of open space that can host events of all sizes and types is sorely needed downtown. Parks that connect to existing parks via trails and/or greenways “can enhance city aesthetics, help shape urban form, and improve urban quality of life.” (APA, “How Cities Use Parks for ... Green Infrastructure”). A large downtown park would serve many functions in Tucson. Those could include floodwater mitigation, a link between downtown and areas to the west of Interstate 10, a multipurpose event space, and a way to reintroduce elements of the Sonoran Desert back to downtown via a connection to the Santa Cruz River Park, The Loop, Sentinel Peak Park, and Tumamoc Hill.

McMahon argues that just as upgrades to sewers, roads, and utilities are needed as cities grow, enhancements to urban green infrastructure - the network of open space, woodlands, wildlife habitat, parks and other natural areas that sustains clean air, water and natural resources and enriches our quality of life - are also needed (McMahon, 2001). This would reposition open space protection from a community amenity to a community necessity (McMahon, 2001). McMahon further argues that GI can reduce opposition to development. A few studies have shown that when people think all lands are prime for development they tend to oppose it everywhere. To the contrary if those same citizens are reassured that special places will be set aside they tend to be more accepting of new development (McMahon, 2001) (APA, “How Cities Use Parks for ... Green Infrastructure”).

In 1999 the USDA and other local, state, and federal agencies as well as non-governmental entities came together and developed a training program that would enable GI to be an integral part of local, state, and regional policies (McMahon, 2001). Together they defined GI as “our nation’s natural life support system — an interconnected network of waterways, wetlands, woodlands, wildlife habitats, and other natural areas; greenways, parks and other conservation lands; working farms, ranches and forests; and wilderness and other open spaces that support native species, maintain natural ecological processes, sustain air and water resources and contribute to the health and quality of life for America’s communities and people.” (McMahon, 2001). McMahon defines GI as a series of hubs and links. Hubs are the origin and destination for wildlife as well as the ecological processes running to or through them. Links are the connections that tie the system together. Examples of hubs would be protected areas such as refuges and reserves, state and national forests, managed lands such as farms, forests, and ranches, regional parks, community parks, and natural areas (McMahon, 2001). Links then connect these hubs through natural areas that connect parks, river and stream corridors, greenways, greenbelts, and ecobelts (McMahon, 2001).

While green infrastructure is a relatively new term it is not a new idea. It can be traced to planning and conservation efforts made over 150 years ago. Green infrastructure has its origin in two important concepts: (1) linking parks and other green spaces for the benefit of people, and (2) preserving and linking natural areas to benefit biodiversity and counter habitat fragmentation (McMahon, 2001). In the late 18th and early 19th centuries Frederick Law Olmsted believed that all parks should be connected together and also to their surrounding neighborhoods. McMahon states that the idea of connecting parks for the benefit of the people has, over time, evolved into the modern greenways movement. In addition to the human benefits of GI, wildlife biologists and ecologists have found that the best way to preserve native plants, animals, and ecological functions is to create and maintain connections to protect against species fragmentation.



McMahon describes many positive outcomes when implementing various aspects of GI. He states that:

Green infrastructure systems help protect and restore naturally functioning ecosystems and provide a framework for future development. In doing so, they provide a diversity of ecological, social, and economic functions and benefits: enriched habitat and biodiversity; maintenance of natural landscape processes; cleaner air and water; increased recreational opportunities; improved health; and better connection to nature and sense of place. Well planned green space has also been shown to increase property values and decrease the costs of public infrastructure and public services, including the costs for stormwater management and water treatment systems (McMahon, 2001).

Over time there has been a shift in the way municipalities and other governmental entities plan for open space. Today many are implementing GI plans that include:

- » Increasing recognition of the problems associated with urban sprawl and landscape fragmentation, particularly on the fringe of major metropolitan areas;
- » Federal water quality mandates;
- » Endangered species protection, particularly the emphasis on habitat conservation plans that protect multiple species and link isolated preserves;
- » Public health concerns, including obesity, that have resulted from inactive lifestyles;
- » An increase in the marketability and resale value of homes near protected green space, such as parks and greenways;
- » Urban revitalization, emphasizing the value of natural areas within the city;
- » Smart growth policies and programs at the state, regional and community levels;
- » Development practices designed to promote environmental, social and economic sustainability (McMahon, 2001)

McMahon states that in order for GI to be most effective it should be the first step in the land use and planning processes well ahead of the actual development. Furthermore he states that it should also be planned in concert with other types of infrastructure such as roads, trails, telecom, and utilities. McMahon states green infrastructure should be:

- » Designed in a way that creates a GI system rather than a series of disconnected and unrelated parts;
- » Planned in a way that maximizes the benefits of the system (economic, social, and ecological);
- » Done in a forum in which the public has input;
- » Involve many experts from many professions;
- » Funded up front rather than as an afterthought.

McMahon (2001) states that when it comes to ensuring the success of GI projects, the following guiding principles should be followed (McMahon, 2001):

- » Be a framework for conservation and development;
- » Design it before development;
- » Creating and maintaining linkages is key;
- » Functions at different scales across multiple jurisdictions;
- » Grounded in science and land use planning theories and practices;
- » Demonstrates that it is a critical public investment;
- » Involves diverse stakeholders.

According to Dolesh (2012) the key to understanding the importance and value of green infrastructure is to understand the concept of resiliency. He defines resiliency as “a measure of how well natural systems function over a wide variety of conditions and challenges.” (Dolesh, 2012). For many communities a measure of how resilient their natural systems are is connected to how much and how connected their parklands are. These connections provide a wide variety of functions such as stormwater mitigation, water filtration, and air purification. Well-designed systems that are incorporated into the existing infrastructure are proving to be a cost-effective way to manage stormwater and pollution problems. Many cities are turning to such cost-effective solutions that are highly functional and more aesthetic. They are finding that parks and other public landscapes can be sustainable and economically feasible alternatives to dealing with stormwater-related issues.

In arid and semi-arid areas green infrastructure can be applied similarly to how it is implemented in other areas of the country. Rain gardens, swales, porous pavement, cisterns and barrels, green streets, green roofs, and riparian buffers are all common practices in arid and semi-arid regions, but function differently in other regions (EPA, 2010). For arid, and semi-arid regions, rain gardens can be important to stormwater mitigation and water conservation efforts. They are generally situated near areas that are highly impervious such as sidewalks, streets, and parking lots. The impervious surfaces are designed in such a way that rainwater is directed to the rain garden while the garden itself is designed to retain and treat as much stormwater as possible. Swales are very similar in function to rain gardens but tend to be linear and are designed to convey water while slowing it down along the way. Another method of dealing with stormwater is porous pavement. This type of pavement generally reduces the amount of runoff while allowing water and contaminants to filter into the soil. A method that can be applied at many scales and that is gaining popularity in arid and semi-arid regions is the addition of rain barrels or cisterns. The overall idea is to capture rainfall from a roof or roof-like surface and store it for future use. In some climates, green roofs can be effective for stormwater management. In arid and semi-arid parts of the world green roofs are not a viable option. They require highly specialized plants and a considerable amount of supplemental irrigation which is highly unsustainable. Irrigation could come from stormwater runoff, although rather periodic, or air conditioning condensate, which is rather seasonal.

In arid and semi-arid regions, swales and rain gardens are the most common form of green infrastructure. When constructing roads and paths incorporating these elements of water harvesting and mitigation is, according to the EPA, called green streets. The EPA describes green streets as a way to “integrate rain gardens and swales into the street design to retain and treat stormwater while beautifying streets and slowing traffic.” (EPA, 2010). These types of systems are generally installed in rights-of-way, medians, traffic circles, and chicanes. Water is directed into them via curb cuts or in some cases installing curbs at grade.

On a larger scale green infrastructure can take the form of riparian buffers. These buffers restrict development in lands adjacent to washes, creeks, and streams. They can also simply be places where it's important to control channel erosion and to maintain channel form and function (EPA, 2010). The EPA further states that "when applied throughout a watershed, riparian buffers can provide multiple environmental and social benefits. By preserving an interconnected network of habit, riparian buffers can increase wildlife diversity in urban areas. Many communities designate recreational trails within riparian buffers. These trails can provide access to nature as well as opportunities for physical activity." (EPA, 2010).

LOW IMPACT DEVELOPMENT

LID is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible (water.epa.gov). Stormwater is managed in a way that mimics natural flow patterns and watershed characteristics. LID strategies integrate green space, native landscaping, natural hydrologic functions, and various other techniques to generate less runoff from developed land (nrdc.org). According to the EPA "By implementing LID principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. Applied on a broad scale, LID can maintain or restore a watershed's hydrologic and ecological functions." (EPA, "Low Impact Development (LID)").

As an alternative to traditional stormwater design, the use of LID practices such as bioretention, pervious pavements, and grass swales have increased in recent years. (Dietz 351). According to research performed by Deitz "The effects of traditional development practices on the hydrologic cycle have been well documented. Increases in the impervious surfaces associated with urbanization have resulted in increased surface runoff, increased runoff velocity, decreased time of concentration, and decreased water quality" (Dietz 351).

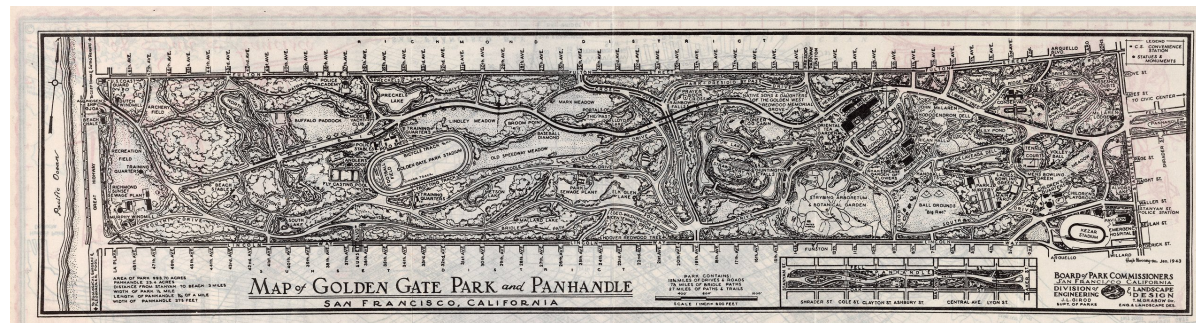
LID was piloted in Maryland as a way to mitigate the effects of increasing urbanization and impervious surfaces (Dietz 351). As stated by Dietz "The preservation of the pre-development hydrology of a site is the overall goal of LID. In contrast to typical stormwater design, the LID approach advocates for more careful site design in the planning phases. The purpose of the site design is to preserve as much of the site in an undisturbed condition, and where disturbance is necessary, reduce the impact to the soils, vegetation, and aquatic systems on the site. In contrast to traditional stormwater treatment, which typically only mitigates peak flow rates, the use of LID will also help to maintain the pre-development runoff volume" (Dietz 351-352).

Pyke states that "Stormwater runoff from roads, rooftops, parking lots, and other impervious cover in urban and suburban environments is a well-known cause of stream degradation." (Pyke 166-167). This degradation comes in many forms which includes increased flooding and reduced water quality. Generally stormwater is managed according to historic climate conditions, and it is generally understood that global climates are changing. Cities and human populations are rapidly growing meaning that climate shifts may require us to develop new performance standards for Low Impact Development. Over the past century the climate in the United States has warmed causing changes in the amounts, intensity, and forms of precipitation we receive (Pyke 166-167). Pike et al, further state that experts agree that these changes will continue or accelerate into the next century. Because communities are now dealing with uncertainty about what their climate might be like, they are now enacting and implementing LID and smart growth strategies to cope with impending stormwater management issues. Generally LID strategies call for increased on-site retention and infiltration of stormwater. High density development, installation of green infrastructure, preservation of natural lands, and re-use of already developed lands are all common LID practices (Pyke 167).

In recent years LID has grown in popularity as a means of reducing non point source pollution from residential areas (Clausen, Hood, Warner 58A). The recent interest in the popularity of low impact development is the result of several factors including: new insights into the impact of urban stormwater, new application of stormwater technology, and new stormwater laws (Clausen, Hood, Warner 58A). Clausen states that "Following the clean-up efforts of point source pollutants in the 1970's and 1980's non point source pollutants were recognized as the leading source of water quality impairment in the United States" (Clausen, Hood, Warner 58A). This source of pollution is significantly impacting our natural water features such as rivers. Ultimately, amendments were added to the Clean Water Act in 1987 that required states to develop stormwater management plans. Because of this, many states now have LID guidelines and specifications. However, because there was little scientific data to support the legitimacy of LID practices, many governmental agencies and municipalities were reluctant to require LID to be part of the planning process. In recent years, proactive communities and a growing body of literature have helped to make LID practices mainstream and in some cases a requirement in new development. Some of these successes can be traced back to a study done over a 10 year period in Connecticut called the Jordan Cove Urban Watershed National Monitoring Project. This study was performed in order to demonstrate the positive impact of LID strategies. Even though the study was conducted in a relatively small residential subdivision, it was able to demonstrate that downstream flooding, runoff, and peak discharges were reduced due to the LID measures that were incorporated into the planning of the subdivision.

PARKS

In the late 19th century and early 20th century proponents of parks were convinced that people fell into various social vices such as poor health, crime, poverty, and political corruption because of their disconnection from nature. They argued that parks could remedy those vices simply by reconnecting people with nature. In this era, romantic park proponents believed that "parks improved society" and "that nature was designed, balanced, and inherently good" (Young 537). Parks during this era were designed to "reproduce the design and balance of nature to capture its goodness. The goodness of the virtues would supposedly be instilled in park users if the park was well designed" (Young 537). Typically parks of this era consisted of manicured and recreated "nature" with framed views and carefully planned experiences. The typical layout was large expanses of "meadow like" open areas that were surrounded by thick woods. Water bodies were carefully laid out to connect each space as well as define the boundaries between spaces. This all changed in the 1880's with the redesign of Golden Gate Park in San Francisco. First planned in 1870 by William Hammond Hall and John McLaren, followers of Frederick Law Olmsted, Golden Gate Park was the typical romantically designed park with the prototypical curvilinear paths, generic layout, nearly uniform green color and lack of recreational space.



Through a decade-plus long series of redesigns and debate, a series of programmed spaces started to be incorporated into the park. Those included a playground, athletic fields, tennis courts, and areas for ornamental horticulture, something previously unheard of but today is commonly seen in parks. Even though most of the original spaces have been modernized over time, the spaces themselves have the same programs as they did over 100 years ago and are just as successful now as they were back then.

Throughout history parks have always been recognized for their contributions to their surrounding neighborhoods. They've always been valued for their aesthetic and physical benefits. Modern parks and park systems are valued for what they provide to the community as a whole beyond being an asset and providing recreational opportunities. Today's parks can offer a variety of opportunities such as youth development and gaining work experience. For youths and adults alike parks can introduce them to the world of work and give them the skills they need to build a strong foundation and gain valuable experience. Some of the skills people could acquire include maintenance, horticulture, and leadership amongst many others. In addition, parks can build what Walker defines as "social capital" (Walker 3). Walker states that "parks help build and strengthen ties among community residents by bringing people together, including those who are otherwise divided by race or class, and by helping them work together on common projects." (Walker 3). He further states that they provide avenues through which information, values, and social expectations flow, and they empower people to tackle community wide problems, embark on collective actions, and advocate effectively for their community." (Walker 3).

Traditionally, many urban open spaces were seen as places where all persons rich and poor could commingle and be on equal footing. Thompson argues that "Today, we need a more sophisticated understanding of the democratic process in order to identify, and provide for, the needs and desires of all in the diverse mosaic of our urban cultures" (Thompson 60).. Thompson further states that "instead of the park as "melting pot", we need the "salad bowl", where different cultures can find individual expression" (Thompson 60).

The people who perhaps have most need for access to public parks and the opportunity for sociability in a safe, outdoor setting will always be those who are least freely mobile (through age, economic status, lack of private transport, etc.)—children, older people, disabled people, the unemployed—and so there will always be a demand for good access to appropriate, local open spaces. Just what form these spaces take continues to be the challenge (Thompson 61).

Thompson states that we shouldn't think of urban open spaces as isolated but a "vital part of the urban landscape with its own set of specific functions." (Thompson 61). She goes on to state that:

Public space should be conceived of as an outdoor room within a neighbourhood, somewhere to relax, and enjoy the urban experience, a venue for a range of different activities, from outdoor eating to street entertainment; from sport and play areas to a venue for civic or political functions; and most importantly of all a place for walking or sitting-out. Public spaces work best when they establish a direct relationship between the space and the people who live and work around it (Thompson, 61).

Conventionally parks have been maintained in a state of homeostasis where the look and functions of the spaces seldom change from the original plans. Today there is a line of thought that is more ecological in nature. Parks could be allowed to evolve over time where “natural processes would allow for plant growth and succession” (Thompson 67). Parks could be allowed to change over time in the kind of homeorrhetic or long-term, cyclical way that natural succession follows, rather than be subject to the homeostatic regulation of equilibrium around an unchanging norm. Park use might follow a pattern of patches of different stages in the ecological cycle, depending on whether the use needed open space (e.g. for picnics), woody invasive scrubland (e.g. for adventure playgrounds or mountain biking) or more mature woodland (e.g. for walks or nature study) (Thompson 67).

As a conclusion to her research Thompson states “...plans to define artistic visions, function-specific space, and the neat, safe and decorative parks which offer equity of access for all. But these plans will be within the fuzzy framework of an open space network which is dynamic in aesthetic and ecological status, allowing for a larger mosaic, a patchwork of changing, loose-fit landscapes” (Thompson 70). She concludes by stating:

Ultimately, I see open space in cities as places to celebrate cultural diversity, to engage with natural processes and to conserve memories. Urban open space must provide a place for the meeting of strangers and a place where one can transcend the crowd and be anonymous or alone. And in all of this, the urban park will continue to serve a central function in society's self-definition. (Thompson 70).

While international efforts are being made to protect the natural environment, they generally seek to protect untouched or biodiverse areas with threatened flora and fauna. This is detrimental to natural areas closer to where most people live because of the lack of focus on maintaining, protecting, or restoring those areas in an urban setting. With regard to sustainability, most cities focus on the built form but pay little attention to the natural environment. Chiesura states “that urban parks and open green spaces are of a strategic importance for the quality of life of our increasingly urbanized society” (Chiesura 129). A growing body of evidence “... indicates that the presence of natural assets (i.e. urban parks and forests, green belts) and components (i.e. trees, water) in urban contexts contributes to the quality of life in many ways” (Chiesura 129). Besides the ecological functions of parks, there are a number of psychological benefits. Some studies have suggested that parks may have psychological and mental benefits to those to use them; simply the act of being around vegetation and water has a calming and rejuvenating effect on people who frequent parks. It is also hypothesized that people who use parks tend to be healthier overall. Chiesura states that besides the mental and psychological benefits of using parks, they may have an economic impact as well. She goes on to state that “aesthetic, historical and recreational values of urban parks increase the attractiveness of the city and promote it as tourist destination, thus generating employment and revenues.” (Chiesura 130).

Since there is no real accepted definition of what makes a park or a city sustainable, many places around the world have attempted to come up with various measures of how sustainable their home is, but the since the same standards are not accepted or used from place to place, it's difficult to measure what makes a place sustainable. That being said Chiesura indicates that "it is strongly believed that developing more sustainable cities is not just about improving the abiotic and biotic aspects of urban life, it is also about the social aspects of city life, that is—among others—about people's satisfaction, experiences and perceptions of the quality of their everyday environments" (Chiesura 131). Keeping sustainability and psychological factors in mind Chiesura suggests that the following questions be asked:

- » Why do people need urban parks?
- » Which benefits do they get from visiting them?
- » Do these benefits really affect their quality of life? (Chiesura 131)

Across the nation parks have been created "from former factories, home sites, office buildings, railyards, parking lots, landfills, and even highways" (Harnik, Welle, Pingree 1). Many of today's parks aren't being created by park and recreation departments but by various redevelopment authorities because, like many urban centers, municipalities are financially strapped and don't have the capital or influence to create new and vibrant public spaces. According to a 2008 study by the Center for City Park Excellence (CCPE), 75 new parks were created by redevelopment and housing authorities (Harnik, Welle, Pingree 1. Harnik calls these new parks "redeveloparks". The task of redevelopment authorities is to take vacant or undesirable lands and improve them in some way. If done well and with the right public and private partnerships in place, new urban parks can be wildly successful. They can spur further redevelopment, be a boon for a local economy by bringing in new users, festivals, buildings, tourists, and investors, and they can also reenergize existing neighborhoods and make them healthy once again.

According to Nowak, parks make up about 6% of a city or town in the contiguous United States (Nowak 3). He estimates that the percent equates to approximately 370 million trees. Nowak goes on to state that tree canopy, even though varied from region to region, has many benefits. Some of the benefits of urban park trees come in the form of air quality in and near parks. Air quality, air temperature, air pollution, ultraviolet radiation, and carbon dioxide are all measurable benefits from park trees.

Nowak states that in general parks have lower air temperatures than surrounding areas (Nowak 4). He goes on to state that in some cases temperatures at the center of a large park, at night, could be up to 13 degrees cooler than the surrounding city areas. Nowak states that day or night trees have cooling effects on parks which provides a great deal of human thermal comfort.

Regarding the reduction of air pollution, Nowak indicates that park trees not only remove pollutants but also can reduce building energy use in and near parks. U.S. urban park trees are estimated to remove 75,000 tons of air pollution per year or about 80 pounds of air pollution per acre of tree cover (Nowak 4).

With regard to ultraviolet radiation Nowak states that:

Park trees can shield people from ultraviolet (UV) radiation, as tree leaves absorb about 95% of UV radiation. The reduction in UV exposure to park visitors is important because excess exposure to UV is the cause or contributing factor for three types of skin cancer, and UV radiation is also blamed for contributing to cataracts of the eye (Nowak 4).

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Nowak states that “trees and vegetation in parks can help reduce carbon dioxide (a dominant greenhouse gas) by directly removing and storing carbon dioxide and indirectly by reducing air temperature and building energy use in and near parks” (Nowak 5). Nowak goes on to state that trees and soil can store 40 and 32 tons, respectively, of carbon dioxide per acre of park in the United States and can remove approximately 1.2 tons annually. The effects on climate change through the use of park trees could be significant (Nowak 5).

With climate change and park management in mind Nowak created a list of recommendations for urban parks. These include...

- » Consider that most of the effects of trees on microclimate and air quality are beneficial for park users and nearby residents.
- » Park designs that include a variety of land cover—areas of dense trees, scattered trees, and lawn—are likely to provide the greatest opportunities for optimum physical comfort of visitors.
- » Increase the number of healthy trees (increases pollution removal and carbon storage).
- » Sustain existing tree cover (maintains pollution removal levels and carbon storage).
- » Maximize use of low volatile organic compound (VOC) emitting trees (reduces ozone and carbon monoxide formation).
- » Sustain large, healthy trees (large trees have greatest per tree effects on pollution and carbon removal).
- » Use long-lived trees (reduces long-term pollutant emissions from planting and removal).
- » Use low maintenance trees (reduces pollutants and carbon emissions from maintenance activities).
- » Reduce fossil fuel use in maintaining vegetation (reduces pollutant and carbon emissions).
- » Plant trees in energy conserving locations (reduces pollutant emissions from power plants).
- » Plant trees to shade parked cars (reduces vehicular VOC emissions).
- » Supply ample water to vegetation (enhances pollution removal and temperature reduction).
- » Avoid pollutant sensitive species in heavily polluted areas (increases tree health).
- » Utilize evergreen trees for particulate matter reduction (year-round removal of particles).
- » Where feasible, provide park recreation areas with large trees to give visitors the option of being in shade.
- » Consider posting for park visitors up-to-date recommendations from health authorities on avoiding excessive exposure to UV radiation. Usually these recommendations include seeking shade around midday.
- » Utilize wood from removed trees for energy or in long-term products. (This reduces the need for fossil-based energy or reduces or delays carbon emissions.) (Nowak 5).

NATURAL, HISTORIC AND CULTURAL RESTORATION

Through a combination of natural and cultural events nearly every landscape is a layered landscape. These histories are inscribed physically—in soil horizons, bedrock layers, fossils, petrified wood, rotting stumps, and decaying bones—as well as in pot shards, arrowheads, ancient hearths, bullets, rusting factories, stone walls, abandoned mines, and plumes of contaminated groundwater (Hourdequin 1). Physical landscapes evoke and intertwine with social and cultural meanings, and through the active management of landscapes urban, rural, and wild, we foreground some layers and background or bury others (Hourdequin 1).

According to Hourdequin, as concern grows over global climate change, the role of history as it pertains to our relationship to the natural world has become more complex and contentious (Hourdequin 13). This is particularly true when dealing with ecological restoration. Restoration has generally looked to the past in establishing goals and judging success which, in light of the aforementioned global climate change, becomes complicated because the word restoration itself suggests bringing something back to its former state. Because of changes to our climate Hourdequin suggests that traditional restoration goals should be called into question. Whether due to natural disturbances, human development and changing landscape contexts, or climatic change, the relevance of historic reference conditions has been repeatedly challenged (Hourdequin 1). Overall, ecological restoration has for the most part focused on returning a site back to a condition that existed before humans impacted it or at least to its pre-disturbance condition. Today, however, because of social, political, cultural, and climatic influences the notions of bringing a site back to its original state are being challenged. Currently goals for site restoration are being revised to take into account the aforementioned changes. The concept of layered landscapes can assist restoration goals for a site.

Today there are two camps of thought when it comes to restoration. Hourdequin refers to them and the historicists and futurists (Hourdequin 2). The historicists believe that a site should be restored back to its natural state. They are concerned about losing anchors to the past and worry that human preference will dictate what restoration efforts are made. Futurists, according to the Hourdequin, believe that the human and natural worlds are so intertwined that they are inseparable. They argue that traditional restoration goals no longer make sense and that we should now try to restore damaged landscapes to produce functional ecosystems that meet human goals.

Hourdequin argues that restoration of layered landscapes needs to focus on the interdependence of the human and natural systems. Ecologically oriented restoration goals are often focused on ecological integrity, ecosystem functioning, and diverse plant and animal communities. They can be integrated with social and cultural values to produce restored landscapes that preserve or revitalize multiple landscape layers (Hourdequin 4). Natural elements can be paired with human elements from the sites past in a literal or metaphorical manner to remind us what had been there. Hourdequin goes on to state these flexible and creative forms of restoration provide rich opportunities to preserve and learn from complex meanings in layered landscapes, and they offer a new role for history in restoration.

Hourdequin states that landscapes should be read as “texts” in which each layer is stacked upon the other offering many interpretations (239). Ultimately this creates issues when it comes to restoration because each layer of history tells its own story which could lead to conflicts in what to restore and what to bury or at least minimize. Because history can be distressing and unpleasant Hourdequin suggests that the arts can help to accommodate our understanding of these multi-interpretable layered landscapes, but should also play a more critical role of challenging dominant interpretations of landscape that might suppress painful, embarrassing or otherwise difficult aspects of (the history of) a place (239). By bringing forward or even amplifying alternative views and readings, art can help to contest the taken for granted meanings of landscape, and thus bring them back to the heart of the moral debate (Hourdequin 239). All of these interpretations, of the layers within the landscape, tell our story and who we are in these places. Hourdequin argues that the appropriate restoration of a historical landscape should seek common ground when it comes to interpretation but also be open to different views (239-240). Without differing views Hourdequin states that restoration of the meaning of layered landscapes is doomed to fail (240).

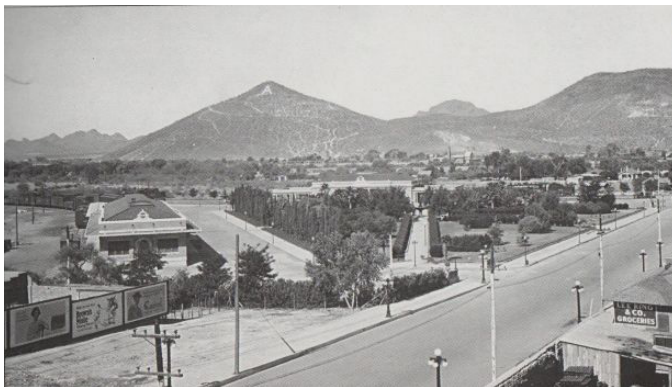
The El Paso & Southwestern System
Announces the Inauguration of
Through Train Service
Between El Paso and Tucson

On the following Schedule:

Lv. El Paso.....7:30 P. M.	Lv. Tucson.....6:20 P. M.
Lv. Douglas.....6:40 A. M.	Lv. Bisbee.....9:15 P. M.
Lv. Bisbee.....6:50 A. M.	Lv. Douglas.....11:00 P. M.
Ar. Tucson.....11:00 A. M.	Ar. El Paso.....7:00 A. M.

Train will consist of baggage-mail and coaches between El Paso and Tucson; Cafe-Parlor-Observation car between Douglas and Tucson; Standard electric lighted Pullman sleeping car between El Paso and Douglas.

EUGENE FOX, General Passenger Agent.



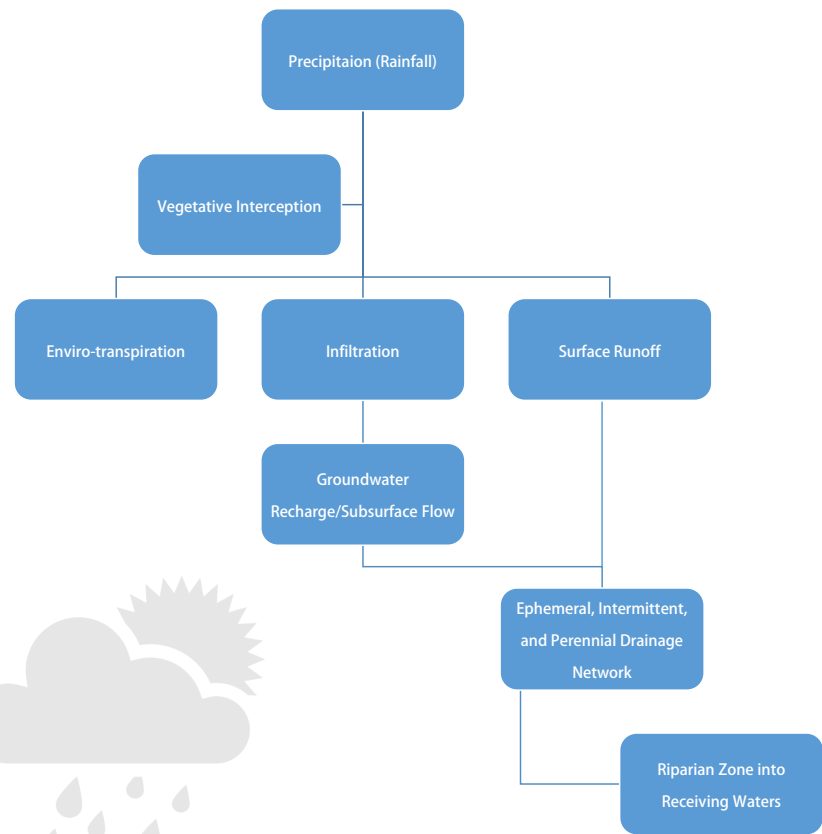
SUSTAINABLE STORMWATER DESIGN PRACTICES

Traditionally, stormwater management plans were designed to quickly convey water away from the site. This approach however creates numerous problems downstream such as flash flooding. To remedy this stormwater professionals designed detention structures to detain and ultimately release stormwater at a flow rate that mimics pre-development conditions. The problem with this is these systems are not designed to address runoff quality or any additional volume going into the system and they ignore any ecological issues. The result of these practices is the de-watering of the landscape causing man-made drought conditions. These types of stormwater management systems are not based on and do not replicate the natural processes of evapotranspiration, infiltration, and runoff and generally destroy any ecosystem that pre-existed development (Calkins 74-75).

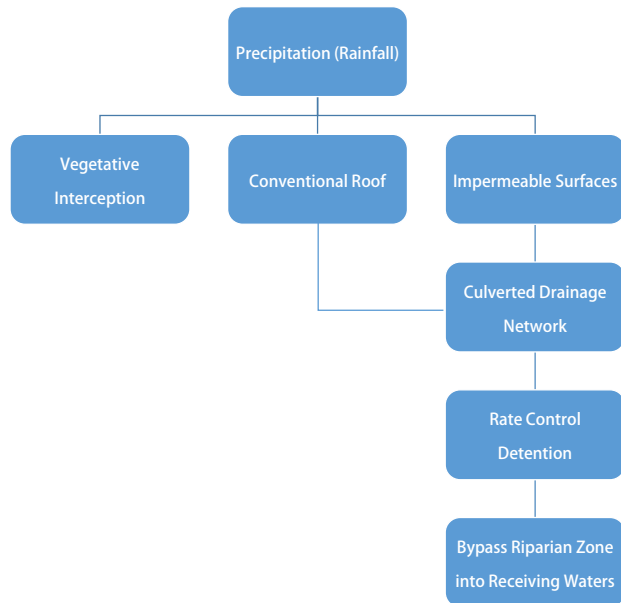
Today however more sustainable stormwater design practices are being designed and implemented to mitigate and correct the failures of the traditional methods of conveying stormwater away from a site as quickly as possible without regard to the existing pre-development conditions. Calkins (Calkins 75-76) states the following benefits of sustainable stormwater management:

- » Reduce onsite and downstream flooding
- » Reduce flooding caused by combining detained runoff
- » Lower site and regional stormwater systems cost
- » Lower peak storm flow frequency and duration
- » Reduce soil erosion, stream siltation, and downstream scouring
- » Reduce nonpoint source and thermal pollution
- » Replenish groundwater
- » Supplement domestic water supply
- » Restore low stream base flow
- » Improve aesthetics
- » Enhance recreational opportunities
- » Provide wildlife habitat
- » Improve safety
- » Maintain appropriate soil moisture

Natural Flow Model



Conventional Flow Model



Adapted from the Sustainable Sites Handbook p. 77



CONCLUSIONS

KEY OUTCOMES

Green Infrastructure

- » Just as important as other infrastructure such as utilities and transportation
- » Most effective when interconnected
- » Multiple benefits to humans and the natural environment
- » Largest impact when it is the first step in land use planning ahead of development
- » Cost effective and aesthetic way of dealing with stormwater

Low Impact Development

- » Can maintain or restore watershed hydrologic and ecologic functions
- » Increasingly important due to global climate changes
- » Stormwater is managed in a way that mimics natural flow patterns

Parks

- » Best parks serve many needs, are continuously active, and are part of an interconnected system
- » Brings nature back into a city
- » Can be part of a stormwater management system
- » Must be easy to get to
- » Biggest challenge is money
- » Many successful parks today rely on public/private partnerships

Natural, Historic and Cultural Restoration

- » Site restoration is contentious
- » How far back and to what condition should a site be restored
- » What factors and pieces of history should be featured and which should be suppressed

Sustainable Stormwater Design Practices

- » Best practices look at managing stormwater in a way that is environmentally friendly, mimics pre-development conditions, is aesthetically pleasing, and respects the natural ecosystem.

CASE REVIEWS



The case reviews that follow fall within one of three categories and some in more than one. The following is a breakdown of the ideas that were looked into, analyzed, and the conclusions drawn from each general category. Ultimately this influenced the final master plan and programmatic elements within Depot Park.

MODERN URBAN PARKS

- » Highly programmed spaces
- » Performance spaces
- » Active and passive recreation spaces
- » Gardens
- » Iconic landmark features
- » Draws locals and tourists alike
- » Wide range of activities appealing to diverse users
- » Highly active sites

REVIVING DISTURBED SITES

- » Showcase for native plantings
- » Asphalt and concrete re-used in projects
- » Cleansing native landscapes
- » Restoration of pre-development conditions
- » Highlighting layers of site history
- » Reusing a site for a different use

GREEN INFRASTRUCTURE AND LOW IMPACT DEVELOPMENT BEST PRACTICES

- » Use of native plants and hardy materials
- » Parks designed to manage stormwater
- » Focus on water harvesting techniques and uses
- » Highly sustainable practices
- » Arid climate best practices
- » Highly visible landscape elements used as a tool to educate the public about GI & LID best practices



MILLENNIUM PARK

Location: Chicago, Illinois

Design Team: Frank Gehry, Gustafson Guthrie Nichol, Piet Oudolf, Terry Guen Design Associates

Size: 24.5 acres

Year: 2004

Project Summary:

From the 1850's until 1997 the space now known as Millennium Park was an industrial wasteland. The site, owned by the Illinois Central Railroad, was a mix of parkland, rail yards, and parking lots. Because of its prime location near the Lake Michigan shoreline and close proximity to the civic heart of Chicago and the popular Navy Pier, a movement in 1997, driven by the mayor of Chicago, sought to transform the area into something Chicagoans could be proud of. Planning for the park began in 1997, construction began in 1998, and the park opened 4 years late in 2004 to rave reviews. There is no shortage of amenities in the park which draws locals and tourists alike at all times of the year. Some of the amenities include...

- » Cloud Gate sculpture (aka "The Bean") and Crown Fountain,
- » Lurie Gardens,
- » Pritzker performance pavilion,
- » BP Bridge connection to Daley Park,
- » Welcome Center,
- » Bike center featuring showers, repairs, rentals, and snack bar
- » Performance spaces,
- » Indoor and outdoor galleries,
- » Ice rink, fountains, and a restaurant.

One major design challenge was to build the entire park on top of railyards and a major city parking garage. Because of the engineering successes achieved, Millennium Park is now considered one of the largest green roofs in the world. Beyond the engineering victories, the park is now known worldwide for hosting events large and small all year long and attracting users of all types.

Millennium Park serves as a great example of an urban space that people of all interest groups can gather for a wide range of activities. It has broad appeal to locals and tourists alike nearly year-round. With Cloud Gate, sculptures, performance areas, gardens, playgrounds, and sweeping views of both the city of Chicago and Lake Michigan, there's something for everyone. Lessons can be learned from how to program the spaces to appeal to a wide audience and also be a destination for locals and tourists. Because Millennium Park was built on a former railyard and industrial site, it can also serve as a template for how to mitigate environmental issues while transforming a space into something recognized worldwide.



GOLDEN GATE PARK

Location: San Francisco, California

Design Team: William Hammond-Hall and John McLaren (Influenced by Olmsted and Vaux)

Size: 1,017 acres

Year: 1870

Project Summary:

Due to the California gold rush and subsequent transcontinental railroad, San Francisco historically experienced a transformation from a small port town to a major metropolis. In the 1860's wanting to be mentioned in the same breath as major East Coast cities such New York and Boston. In the 1860's the people of San Francisco felt the need for a large public park along with other cultural amenities such as museums and landmark civic buildings. In 1868 the mayor of San Francisco ordered a survey to find a suitable park space and in 1870 a bill was passed establishing the official park boundaries. The original intent of the park was for outdoor recreation in the style and feel of New York's Central Park, specifically with pastoral vistas, curvilinear paths, gardens, woodlands, and meadows. Today the park includes a conservatory, music concourse, a children's playground (one of the nation's earliest), a Japanese Tea Garden, gardens and groves, woodlands, botanical gardens, sports facilities, a bison paddock, urban nature trails, lakes, and countless other amenities. Over time parts of the park have been recreated, remodeled, and rehabilitated due to changing cultural values and societal needs. The park has been very resilient since 1870 and has responded well to climate change, weather events, and public opinions of how the park should function and what it should contain. It has even served as a place of respite for peoples displaced during the earthquakes of 1906 and 1989. The original intent of the park was for recreation and today that still holds true even though the diversity of activities has grown and changed over time. Today the park hosts events both large and small and is a landmark that draws both locals and tourists alike.

Golden Gate Park, while many times larger than my site, serves as another great template on how to program urban spaces and how those spaces can morph over time to reflect current wants and needs for public spaces. There are a large number of things a person can do at the park. They can participate in passive and active recreation, view a performance, visit a botanical garden, take their dog to an off-leash area, and countless other activities. The park illustrates the need for open spaces in dense urban areas as well as how to appeal to a broad audience.



CHAPARRAL PARK

Location: Scottsdale, Arizona

Design Team: Ten Eyck Landscape Architects (TELA)

Size: 100 acres

Year: 2007

Project Summary:

Ten Eyck set out to activate the area around the Scottsdale Water Treatment Facility and turn it into a cultural and ecological amenity. To achieve this TELA designed curvilinear paths, athletic fields, a dog park, and an amphitheater. The park features turf areas broken up by xeriscape gardens and landscaped areas in an effort to reduce water consumption. To further water reduce consumption, the parks athletic fields were situated in the floodplain of the Indian Bend Wash and an interconnected network of channels and swales are leveraged to irrigate the terraced gardens. The gardens attract birds, butterflies, and other pollinators. Overall, the entire park is designed with hiking, biking, and walking trails that engage park users while encouraging them to explore and observe.

Chaparral Park is a great example of an arid region park. For my site the takeaways are the efforts made to conserve water while keeping the lush park feel that attracts visitors, the use of stormwater to irrigate the park, the use of drought tolerant plants, and the shared use path that goes around the park. Together those elements make for a successful urban park that is not only aesthetically appealing and has good amenities but does so in a way that respects the desert environment.



HIGHLAND VISTA PARK

Location: Tucson, Arizona (Highland Vista Neighborhood)

Design Team: Wheat Design Group

Size: 1.5 acres

Year:

Project Summary:

Highland Vista Park was once a City of Tucson DOT storage yard. Neighboring residents became concerned that a low spot on the southeast part of the property was collecting stormwater. The concern was that the stormwater was dumping pollutants into the Arcadia Wash and the standing water was attracting mosquitos. The neighbors noticed that this area was a good opportunity to reduce ponding on site and show off a variety of stormwater mitigation techniques. Wheat Design Group developed a plan for the site, based on neighborhood input that turned the former storage yard into:

- » A park demonstrating various passive stormwater harvesting techniques,
- » An urban space that educates the public about water harvesting through signage,
- » A space that restores the natural areas and preserves natural corridors and habitats,
- » A place for passive recreation and exploration,
- » A park that features resilient and native plants that take advantage of water harvesting techniques to reduce or eliminate the need for irrigation.

Overall this park is an example of how landscape architects and the public can work together to create a community asset and showcase for modern stormwater practices and resilient landscapes that feature native plants. They were also able to educate the public and give them a piece of the Sonoran Desert in the heart of Tucson.

The implications of Highland Vista Park on my site lies within how a former City of Tucson storage yard was transformed into a neighborhood asset and showcase for arid region water harvesting. The entire premise of the park is it provides area residents insight into how to effectively use various types of passive rainwater harvesting techniques. It is also a showcase for the use of drought tolerant native plants and how they can be arranged in an attractive way.



PIMA PRICKLY PARK

Location: Pima County, Arizona

Design Team: Tucson Cactus and Succulent Society, Pima County Natural Resources

Size: 9 acres

Year: 2011

Project Summary:

In 1983 Pima County bought the land that the park now sits on after a historic flood event. Prior to the purchase the site had been a former gravel and sand pit. Unfit for development because of the high flooding potential, the county deemed it fit for natural park uses. The pits were filled in but small sinkholes still occur from time to time. Today the property is used for Pima County Parks Department offices, the Pima County Native Plant Nursery, and Pima Prickly Park. Over time a public/private partnership has helped fund and shape the park. Initially the park was home to a few hundred cacti but today contains thousands of all varieties. Ultimately the park will be a showcase on how to use native plants in residential settings as well as teaching visitors about water harvesting. The park is free, open to the public, and is open year-round.

The implications for my site, with regard to Pima Prickly Park, lies in how a former highly disturbed site was turned into a community asset and local attraction. The park is a showcase for native plants and passive water harvesting. It is also a case study in how a municipality and the public formed a partnership that is beneficial for all parties involved.



ARIZONA STATE UNIVERSITY POLYTECHNIC CAMPUS

Location: Mesa, Arizona

Design Team: Ten Eyck Landscape Architects

Size: 18 acres

Year: 2009

Project Summary:

The campus, a 2012 ASLA Honor Award recipient, was once the Williams Air Force Base. The end result of the project was the transformation of a barren and hot former military installation into a thriving campus that features everything unique to the Sonoran Desert. One feature that many use or pass by every day on campus is what was once a major road on base. Today it's been turned into an arroyo that harvests water, features native vegetation, and serves as a major arterial connecting students and faculty with nature. The design features a variety of stormwater mitigation techniques that slow and spread water out while allowing it to infiltrate so it can provide water to the salvaged native vegetation and trees that provide much needed shade. Pavement was also removed and permeable treatments such as pavers and stabilized decomposed granite were used to further water infiltration.

Like Pima Prickly Park and Chaparral Park the ASU Polytechnic Campus is a prime example of how to design a park or park-like setting in the arid Southwest. The implications for my site lie in how the blending of both passive and active rainwater harvesting techniques can result in a beautiful and lush landscape that people want to enjoy. The rainwater harvesting techniques are done in an artful manner and in some cases are multi-purpose ; during dry times people can walk or sit in the arroyos and basins. The Campus is also a great case study in how to transform a highly disturbed site filled with asphalt and concrete into a desert oasis.



BILL AND MELINDA GATE FOUNDATION CAMPUS

Location: Seattle, Washington

Design Team: Gustafson Guthrie Nichol

Size: 12 acres

Year: 2011

Project Summary:

The Bill and Melinda Gates Foundation, a 2014 ASLA Award of Excellence winner, sits on what was once 12 acres of parking lot cut off from the neighboring communities by roads. The parking lot covered a former peat bog that had become highly contaminated and polluted by years of industrial use. Through careful planning and remediation the site was transformed into a welcoming public/semi-public space that features plantings that emulate the former peat bog while restoring lost habitat and lost ecological function. Rainwater harvesting takes on a large role. The goal is to not only remediate the site and keep it lush but also to improve the water quality of the watershed. To reconnect the site with the surrounding community, GGN created a new streetscape that ties in with the existing language of trees, plantings, seating, and public art.

The implications for my site lie within how a former highly disturbed site that was once covered by asphalt and concrete, and was highly polluted from industrial activities, could be transformed into a set of spaces that bring back parts of the site to its natural state and ecological function. It also serves as a case study on how to effectively use native plants to remediate soils while improving water quality for downstream watersheds.



ROOKE RESERVE

Location: Truganina, Australia

Design Team: CGP Australia

Size: 3.7 acres

Year: 2010

Project Summary:

The park provides connectivity between a shared use path, for pedestrians and cyclists, an elementary school, an open space, and Skeleton Creek. The goal of the project was to design a site that would engage local residents of all ages. The park had several design goals. The first was to create a design that would encourage two through twelve year olds, because of its proximity to neighborhoods with young families, to use the park but also engage older users in recreational activities. The park was designed to stimulate the senses through the use of color, texture, mixed topography, and a variety of materials. Secondly the park was designed to be water-efficient. A dry creek trail collects surface water runoff from the turf area and garden beds, filters it, and directs it to lower level garden beds. The landscape itself emulates the surrounding topography. CPG created escarpments, riparian zones, and terraced retaining walls that emulate a basaltic outcrop that suddenly rises out of the plains beyond the park. Other runoff is collected in underground tanks for irrigation re-use.

The implications of Rooke Reserve for my site lie in how the park is designed to emulate the climate and topography of the surrounding area, and how it is able to do so in an educational way. Because the arid Southwest is a unique climactic region, the park that I'm proposing could use the natural landscape, plants, and water use regimen that the surrounding landscape offers. There could be an opportunity to use those factors to educate locals and visitors on what makes our city and region unique.



EDINBURGH GARDENS RAINGARDEN

Location: Melbourne, Australia

Design Team: GHD Pty Ltd

Size: 0.17 acres

Year: 2012

Project Summary:

Built with the support of Melbourne Water, the raingarden provides natural irrigation to Edinburgh Park. The raingarden is designed to provide 60% of the water for the park's historic trees and reduce the need for potable water which Melbourne residents need due to continued drought conditions. The park filters rainwater and stormwater and collects it in an underground tank. The collected water is then used to irrigate the park. It's also designed to improve the health of a nearby river and creek by filtering pollutants out of the stormwater. Plants in the raingarden are meant to filter fine sediments and uptake excessive nutrients. Some of the main components of the site are:

- » Four large terraces that respond to the sites natural grade, therefore minimizing the requirement for taller retaining walls and balustrade, allowing informal public interaction,
- » Terrace walls that extend out into the landscape to create lawn 'room' areas for passive recreation. These areas will create elevated views over the raingarden and provide different spatial experience in this area of the park which is currently characterized by large unbroken lawn areas.
- » The strong lines of the extended terrace walls is repeated in the bands of planting in response to the recent history of the site as the location for the Inner Circle Railway Line.
- » A 'zig zagging' feature steel low flow channel, connected to the surcharge pit that delivers water to all four terraces in rain events.
- » New tree planting to provide shade and enclosure for new small lawn areas
- » Continuously curved edge to reinforce line of new shared path and existing avenue planting ("Edinburgh Gardens Raingarden").

The implications of this site for my site are found in the stormwater treatment strategies that are executed in an artful way. The water harvesting and filtering techniques used form the framework of the outdoor rooms water travels through. Each part of the garden is not only a space for passive recreation and respite but also a way to slow, spread, and treat the stormwater. The naturally treated stormwater then enters a nearby watercourse. Even though it's in a different type of environment altogether it still serves as a great example of how to integrate LID and recreational areas in an artful way.



GENE C. REID PARK

Location: Tucson, Arizona

Design Team:

Size: 131 acres

Year: 1925

Project Summary:

In 1925 Willis Barnum and his wife purchased 480 acres of land to create a park and later deeded it to the City of Tucson. Today a little more than 25% of the original 480 acres is now Gene C. Reid Park. 240 of the 480 acres houses two golf courses and the remaining 110 acres are now for residential use. Reid Park is considered Tucson's premier park not only because of its size but because of its location and numerous amenities. Some of those include:

- » A baseball stadium and baseball fields
- » Performance Center
- » Zoo
- » Rose Garden
- » Lake and duck pond
- » Horseshoe facility
- » Dog park

The park has popular ramadas and picnic areas that are always in use and can host both large and small events. Large trees provide a woodland feel and much needed shade.

The implications for my site lies in that it serves as a great local example of what works in a public park. The large number of activities that occur in the park from day to day, year-round, proves that it's popular with people who live near the park as well as people who travel in from other parts of the city. On any given day the walking/running path around the park is in almost continuous use and is used throughout the year for charity runs and walks. The path also serves as a great place to walk a dog because it's a safer alternative to walking in the road which area residents have to do because of the lack of neighborhood sidewalks. Even though downtown has sidewalks my park could provide a quieter and safer experience for walkers and runners.



GEORGE “DOC” CAVALLIERE PARK

Location: Scottsdale, Arizona

Design Team: SmithGroup JJR

Size: 34 acres

Year: 2011

Project Summary:

This park served as the national pilot project for the Sustainable Sites Initiative (SITES) program. The final design was the end of a 20 year long process that ended in a community park that is part of a regional stormwater retention facility. Cavalliere Park is considered a truly sustainable park because of the way it uses its resources. The park features:

- » A photovoltaic array that allows the park to be net-zero energy,
- » Rainwater harvesting,
- » Reuse of on site materials,
- » Low maintenance finishes and furnishings,
- » Reconstructed desert riparian habitat.
- » Rabbits, lizards, snakes, quail, birds, and 16 species of arthropods have been observed in the park (“City of Scottsdale”).

The park captures and infiltrates 100% of the stormwater that falls on the site in a 2-hour, 100-year storm event . The site also manages upstream runoff from upstream developments (“George “Doc” Cavalliere Park”). As a community asset the park features a shaded playground, a 1 mile hiking loop, basketball courts, picnic areas, ramadas, gathering areas, and one natural grass and one sport turf recreation field all of which are designed with the sensitivity of the Sonoran Desert in mind.

There are many implications for my site based on this park. The park is the culmination of all things sustainable in an arid environment. For my site the concepts of rainwater harvesting, reusing on site materials, and harvesting sunlight for energy, in addition to creating new habitat for native wildlife and programmed spaces for passive and active recreation makes for an excellent example of how to design a park for the arid Southwest .



CONCLUSIONS

KEY OUTCOMES

Modern Urban Parks

- » Highly programmed spaces are desirable
- » Performance spaces are common
- » Active and passive recreation spaces give users options
- » Gardens feature native and special plant materials
- » Iconic and recognizable landmark features draw locals and tourists alike
- » Wide range of activities appealing to diverse users
- » Sites are nearly active 24 hours a day

Reviving Disturbed Sites

- » Showcase native plantings to demonstrate their appeal
- » Asphalt and concrete re-used in projects to cut down on materials costs
- » Cleansing native landscapes restores watershed and watercourse health
- » Restoration of pre-development conditions brings in lost natural elements into an urban setting
- » Highlighting layers of site history can connect people to the site and each other
- » Reusing a site for a different use can reinvigorate an area

Green Infrastructure and Low Impact Development Best Practices

- » Use of native plants and hardy materials
- » Parks designed to manage stormwater
- » Focus on water harvesting techniques and uses
- » Highly sustainable practices educate the public on the necessity of conservation and preservation
- » Arid climate best practices highlight dry climate, stormwater, and irrigation techniques
- » Highly visible landscape elements used as a tool to educate the public about GI & LID best practices

SITE INVENTORY & ANALYSIS



SITE INVENTORY

EXISTING CONDITIONS



The site as it currently exists is mainly a combination of parking lots that sit relatively vacant all year long and only come to life during the Tucson Gem, Mineral, and Fossil Show. The rest of the year the only activity on the site is the sporadic traffic that goes to and from the temporary Greyhound Station and the small offices that are part of the El Paso and Southwestern Depot. The site also contains two channelized washes that drain west, under Interstate 10, and ultimately empty into the the Santa Cruz River. The one road that crosses the site is only used by Tucson Fire, Greyhound, and anyone using the pay parking lot in the northwest corner.



PHOTOGRAPHIC INVENTORY

EXISTING CONDITIONS



PHOTOGRAPHIC INVENTORY

EXISTING CONDITIONS



Cushing Street/Frontage Road looking N



Cushing sidewalk looking N



Granada Ave looking N



Frontage sidewalk looking E



Congress Street looking S



Frontage road sidewalk looking NE



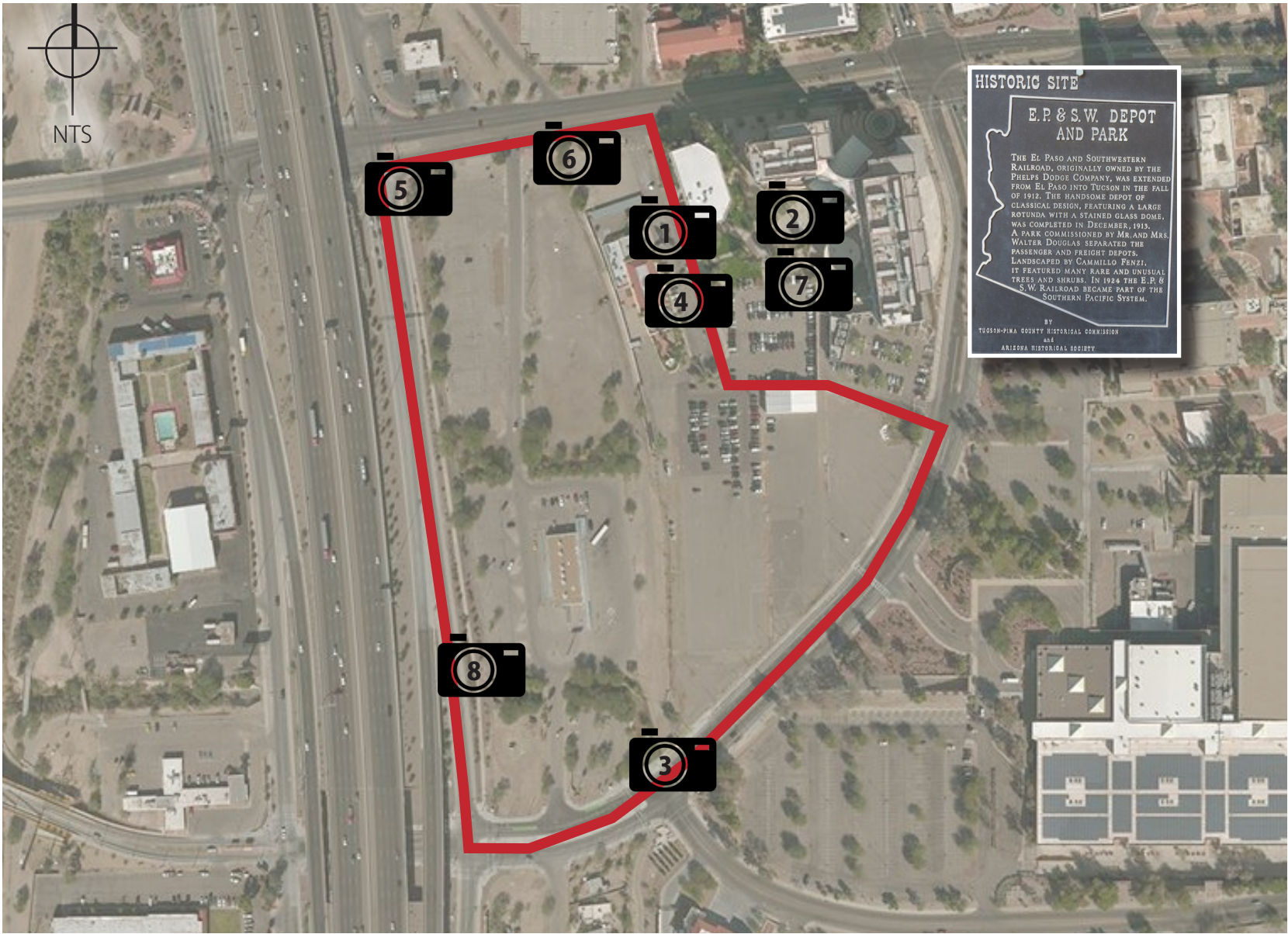
Granada Ave looking N



Congress Street looking SW

PHOTOGRAPHIC INVENTORY

AMENITIES AND ASSETS



HISTORIC SITE

E.P. & S.W. DEPOT AND PARK

THE EL PASO AND SOUTHWESTERN RAILROAD, ORIGINALLY OWNED BY THE PHILIP DODGE COMPANY, WAS EXTENDED FROM EL PASO INTO TUCSON IN THE FALL OF 1912. THE HANDSOME DEPOT OF CLASSICAL DESIGN, FEATURING A LARGE ROTUNDA WITH A STAINED GLASS DOME, WAS COMPLETED IN DECEMBER, 1912. A PARK COMMISSIONED BY MR. AND MRS. WALTER DOUGLAS SEPARATED THE PASSENGER AND FREIGHT DEPOTS. LANDSCAPED BY CAMILLE FENZL, IT FEATURED MANY RARE AND UNUSUAL TREES AND SHRUBS. IN 1924 THE E.P. & S.W. RAILROAD BECAME PART OF THE SOUTHERN PACIFIC SYSTEM.

BY
TUCSON-PIMA COUNTY HISTORICAL COMMISSION
ARIZONA HISTORICAL SOCIETY

PHOTOGRAPHIC INVENTORY

AMENITIES AND ASSETS



El Paso & Southwestern Railroad Depot



El Paso & Southwestern Railroad Fountain Plaza



SunLink stop looking N



Fountain Plaza looking NNE



Congress/I-10 looking SSE



SunTran stop looking E



Fountain Plaza looking S

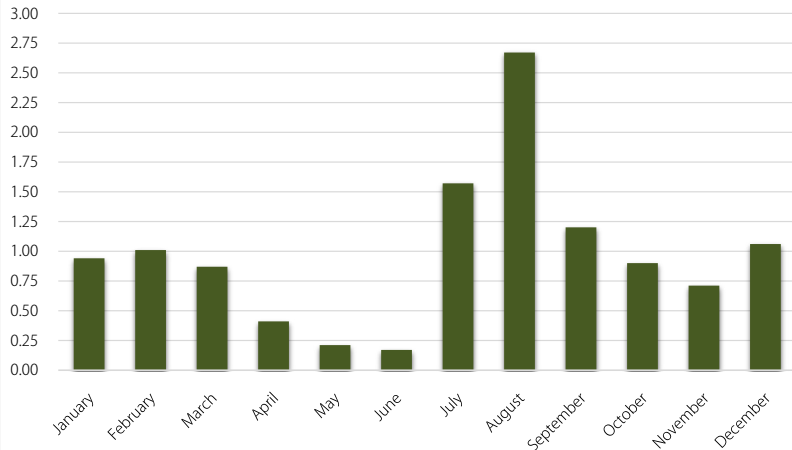


Frontage road sidewalk looking N

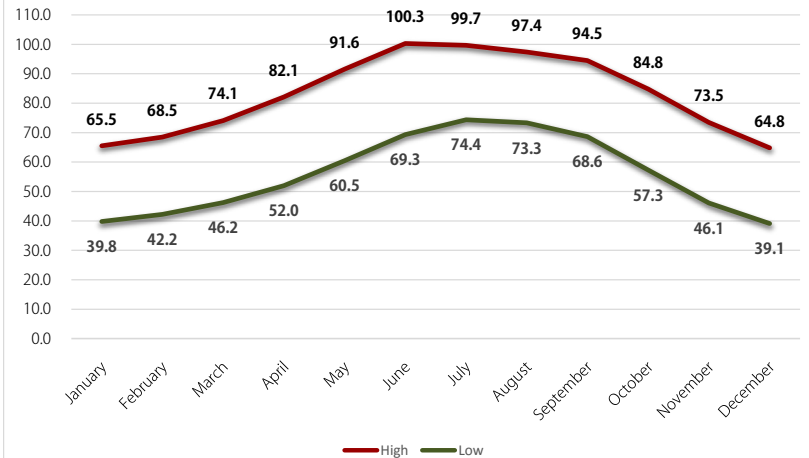
SITE ANALYSIS

WEATHER AND CLIMATE

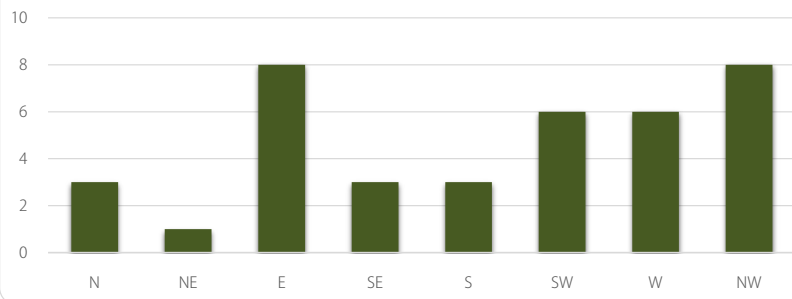
**Tucson Average Rainfall (inches)
1982 - 2005**



**Tucson Average Temperatures (° F)
1981- 2010**



Tucson Yearly Wind Direction Percentage



The fraction of time spent with the wind blowing from the various directions over the entire year. Values do not sum to 100% because the wind direction is undefined when the wind speed is zero.

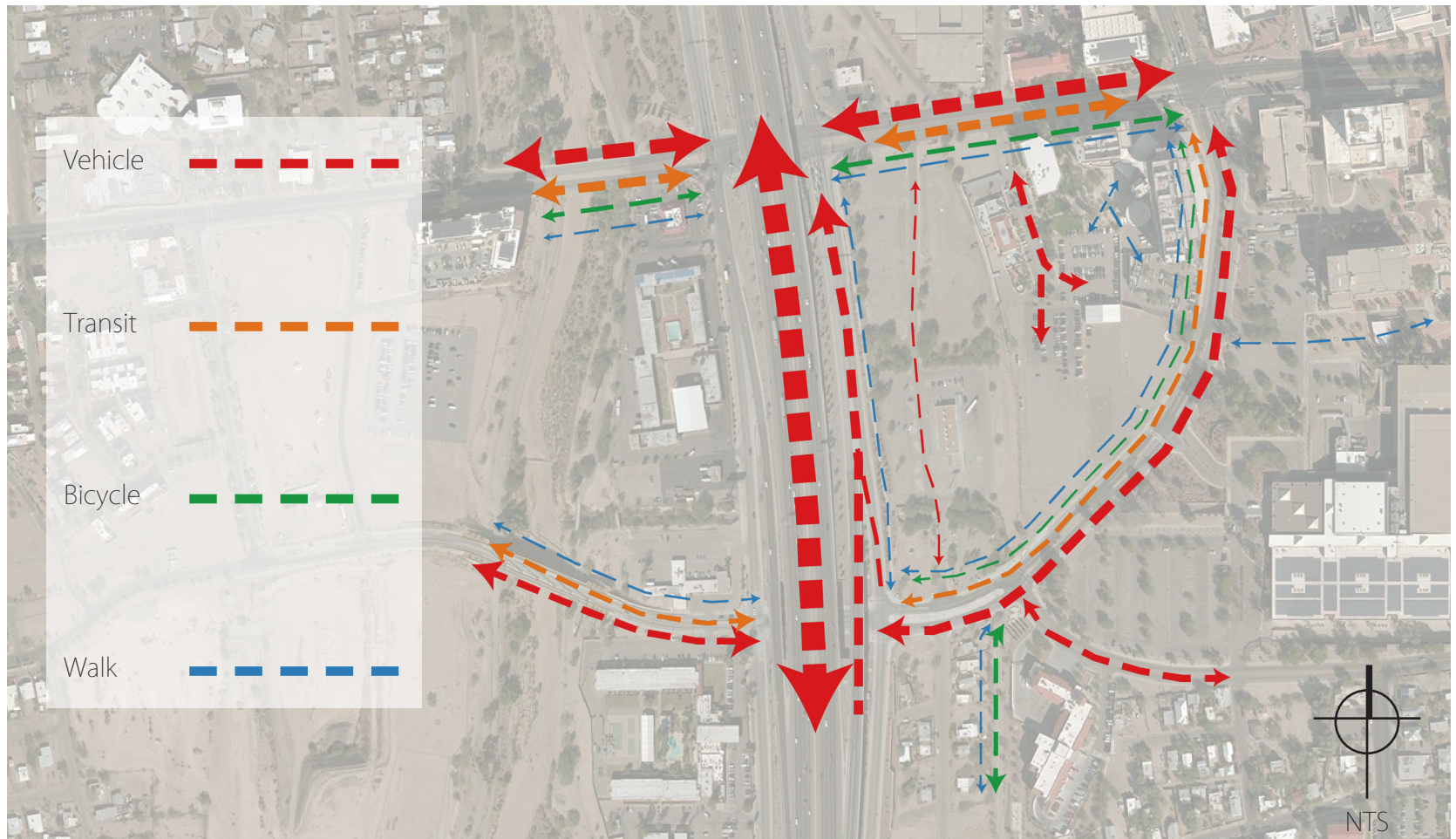
Weather Facts and Figures

- » Record High 117° June 26, 1990
- » Record Low 6° January 7, 1913
- » Wettest winter 9.78" 1992-1993
- » Driest winter 0.01" 2005-2006
- » Wettest summer 13.06" 1955
- » Driest summer 0.81" 1926
- » Average of 310 days of sunshine per year
- » Shortest amount of sunlight 10h 2min on December 21st
- » Longest amount of sunlight 14h 15min on June 20th
- » Median cloud cover is 1% over the course of a year

Sources: National Weather Service / NOAA & WeatherSpark

SITE ANALYSIS

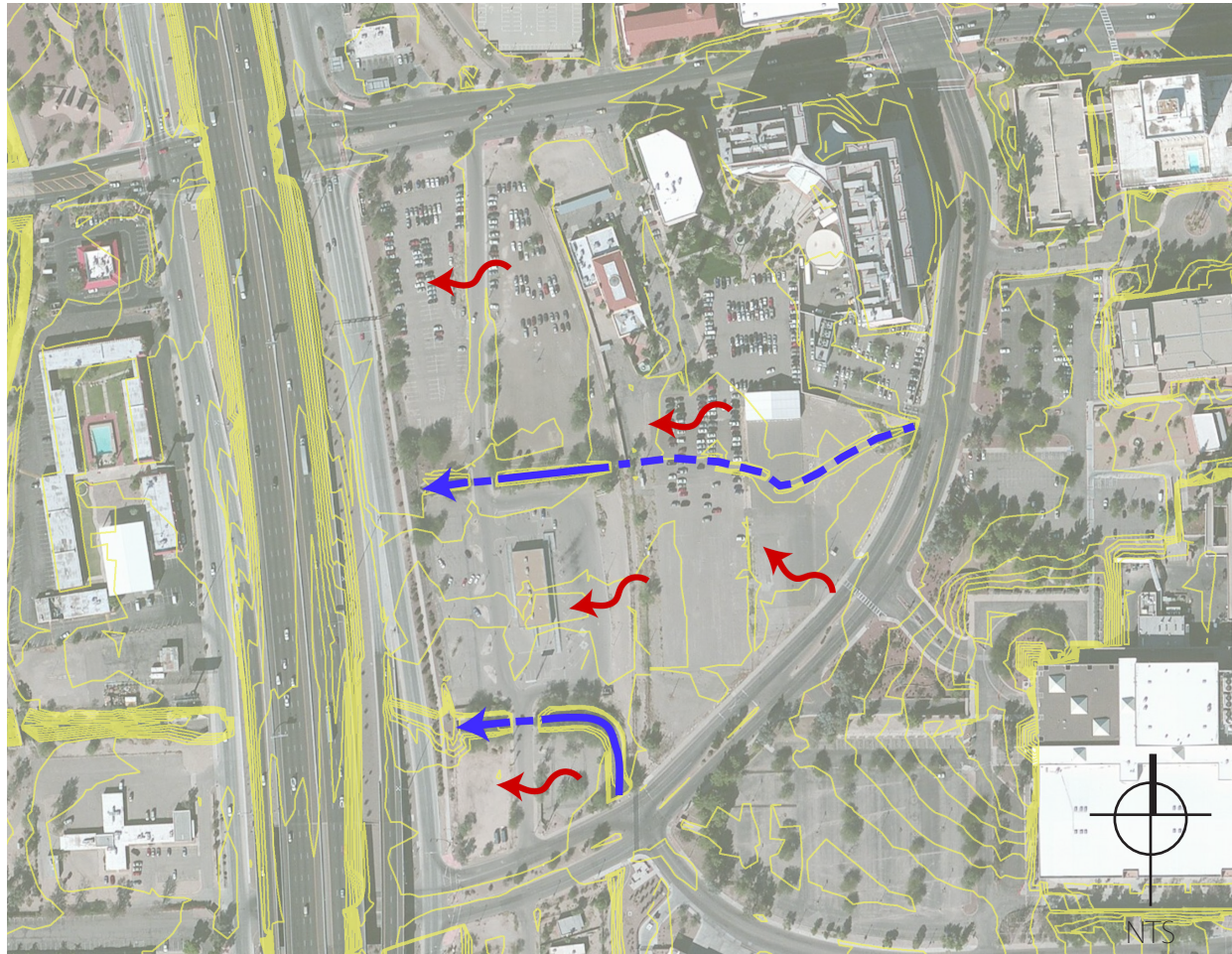
CIRCULATION



As shown in the figure above there are many ways to get to the park site. Experts typically suggest that effective parks and park designs allow users to access it in many ways. This site is approximately 0.25 miles from The Loop Trail, the Santa Cruz River, and greater downtown Tucson. It should take an average person 5-10 minutes to walk to this location. With other forms of transportation you can get to this location fairly easily from nearly anywhere in Tucson especially if you are near the Loop Trail or along a SunTran or SunLink route.

SITE ANALYSIS

TOPOGRAPHY AND HYDROLOGY

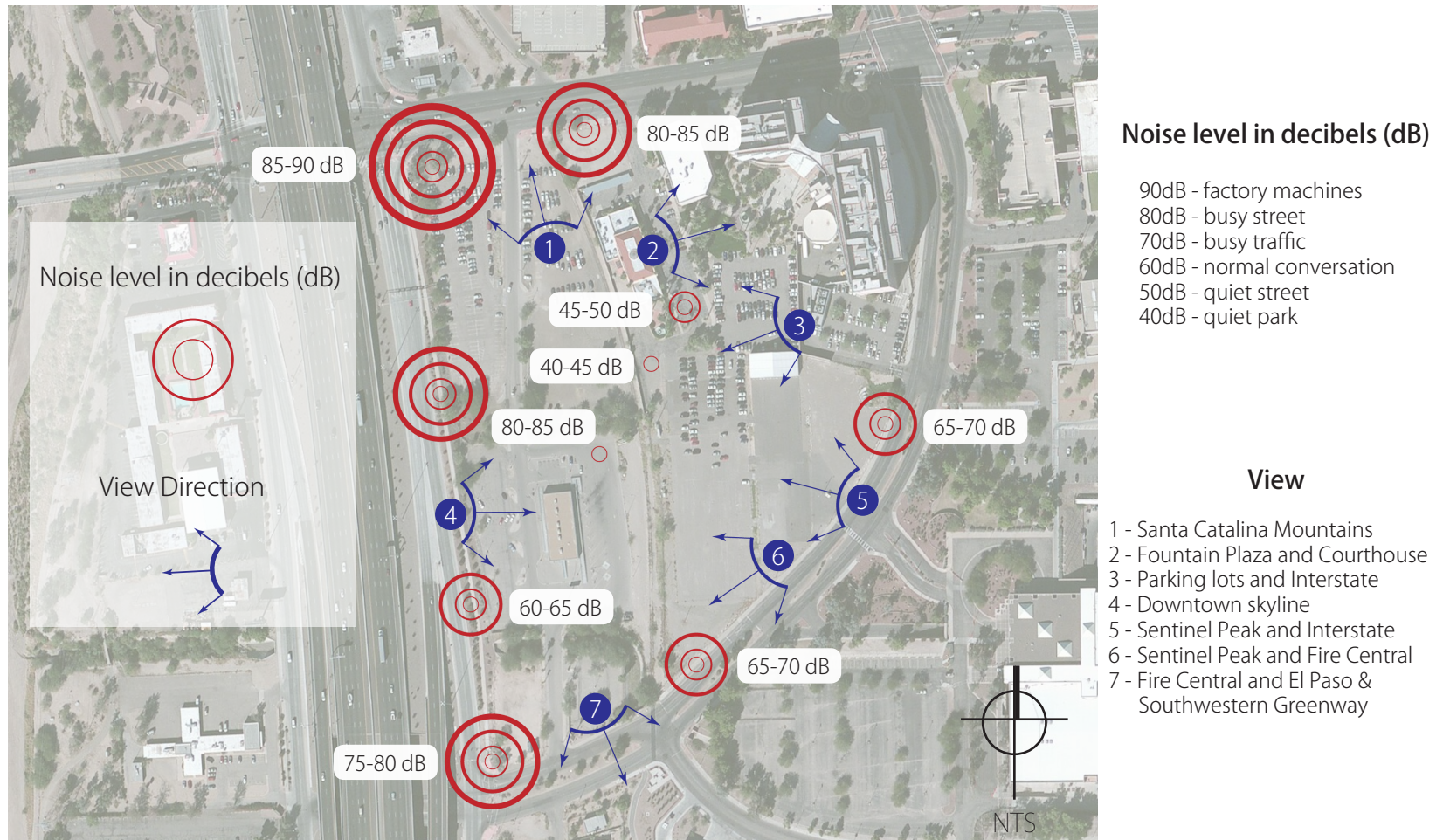


- Channelized wash
- Wash in Box Culvert
- Overland flow direction

The elevation drops approximately 4' from east to west along the site. Most of the relief is in the channelized washes where the bottom of the channel lies approximately 2 to 8 feet below the existing grade. The washes carry stormwater from the site and points east through concrete box culverts where they eventually empty into the Santa Cruz River to the west. Because the project location is mostly impermeable asphalt and highly compacted gravel, stormwater runoff potential is high. It would be generally assumed that road and other contaminants are carried to the Santa Cruz.

SITE ANALYSIS

SIGHT AND SOUND

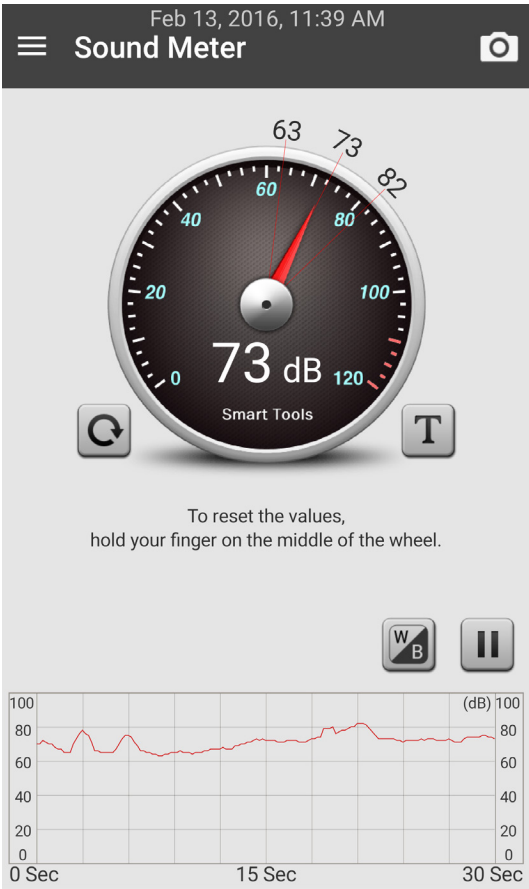
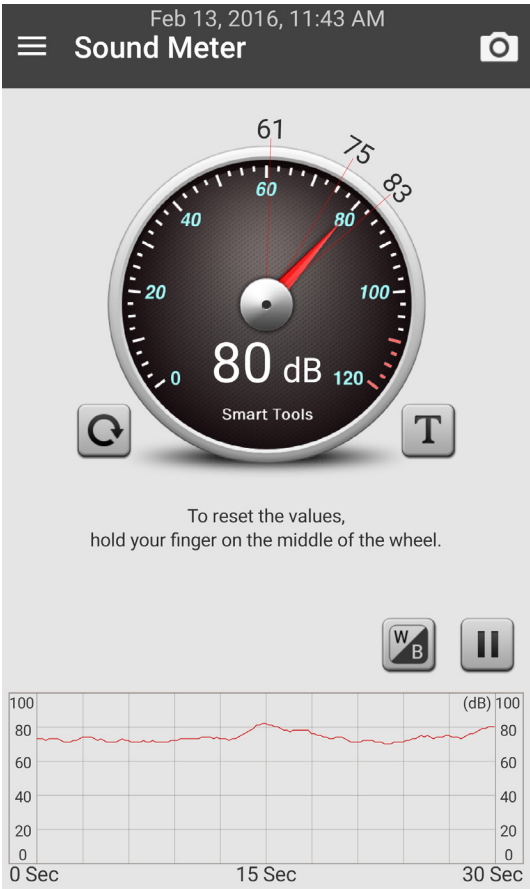
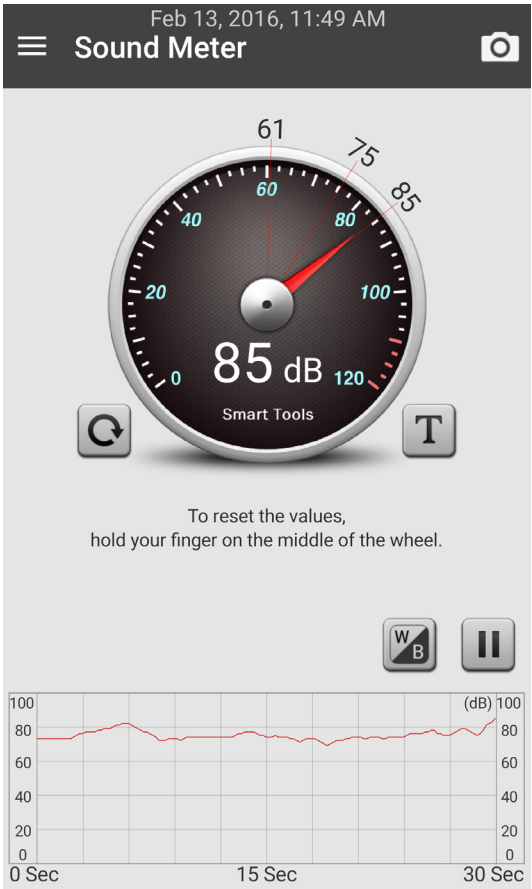


Despite the project site being close to Interstate 10 and a busy Congress Street the interior of the site is quiet. Decibel readings were taken at various spots in and around the site and the results are shown above. Readings were taken using the Smart Tools Sound Meter mobile application on a Samsung Galaxy S6 Edge.

Views are somewhat limited on the site. The best views are from the interior and east sides of the site. From there you can see Sentinel Peak, Tucson Mountains, and the downtown Tucson Skyline.

SITE ANALYSIS

SIGHT AND SOUND - SOUND METER SCREEN CAPTURE EXAMPLES



PROJECT SITE OPPORTUNITIES AND CONSTRAINTS

OPPORTUNITIES

- » Access to El Paso & Southwestern Greenway
- » 0.2 miles from The Loop
- » Along SunTran, SunLink, and bicycle routes
- » Historic train depot and tracks
- » Historic fountain behind the courthouse
- » Short 1/4 mile walk to greater downtown and housing
- » Adjacent to T.C.C.
- » Near I-10 and major streets
- » Several area buildings on the National Register of Historic Places
- » Tucson Gem, Mineral, and Fossil Show



El Paso & Southwestern Greenway



SunLink route along Granada Ave

CONSTRAINTS

- » Site lacks vegetation
- » Noise from I-10
- » Not directly adjacent to the revitalized portion of downtown
- » Limited views due to I-10
- » Heavily disturbed site
- » Not directly along The Loop
- » El Paso & Southwestern Greenway is not built out
- » Development would displace Gem, Mineral, & Fossil show tents that use the site
- » Loss of public parking

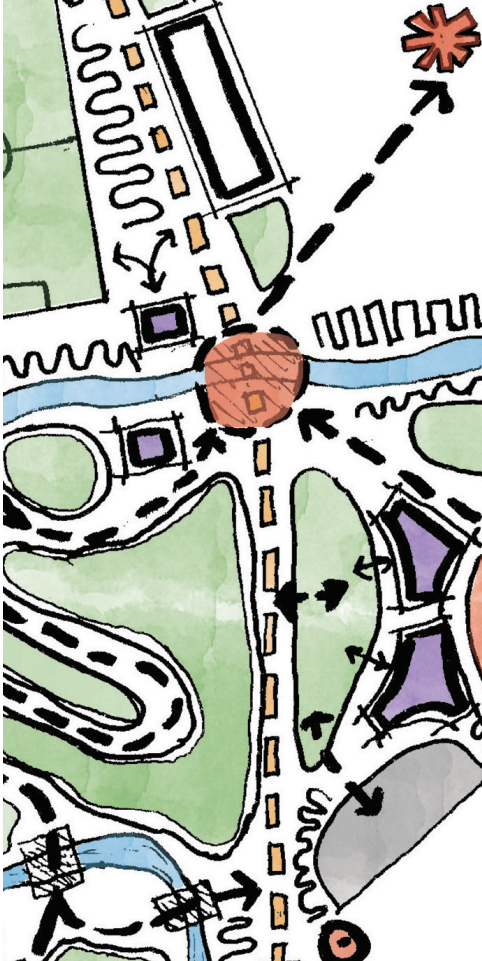


Cushing St & I-10



Congress St & Central Ave

DESIGN APPLICATION



This chapter focuses on the processes undertaken in order to create Depot Park and the resulting designs that were the outcomes of those processes. The design intent for Depot Park was to create a sustainable multi-use urban park that will appeal to a wide array of users. By considering all the factors from the literature reviews, case studies, and site analyses and inventories a more refined design program was ultimately formed.

The following program outlines the goals, objectives, and elements that served as the guiding design principles that went into the creation of Depot Park. The following pages illustrate my design program, the concepts that came out of them, the final concept derived from the initial concepts, and the master plan that was the result of that process. Following the master plan a series of focus areas were chosen to illustrate, in more detail, the design interventions that showcase the program elements. To further expand on the master plan and focus areas specific details are shown to further illustrate stormwater interventions taken, what plants are suggested for the site, and some of the architectural design and landscape influences referenced for Depot Park.



Project site in 1963

PROGRAM

GOALS

OBJECTIVES

ELEMENTS

Create connections



- » Connect to The Loop, SunLink, El Paso and Southwestern Greenway, and greater downtown Tucson with multi-use paths

- » Greenway following old track bed
- » Path connecting to historic fountain
- » Entrance/Exit leading to Sosa-Carillo House and La Placita area
- » Provide free public WiFi

Increase human thermal comfort and conveniences



- » Use drought tolerant shade trees of varying size
- » Provide shade structures
- » Add bicycle amenities
- » Add restrooms

- » Shade trees
- » Ramadas and shade structures
- » Add bike parking and basic maintenance stations
- » Dog park

Promote site and area history



- » Highlight the El Paso & Southwestern Railroad depot and railroad tracks
- » Emulate styles of existing and demolished EP&SW buildings
- » Daylight washes

- » Signage/logos reinforcing place history
- » Exhibits/placards displaying past history
- » Illustrate importance of the Santa Cruz River floodplain and use for irrigation

Showcase sustainability

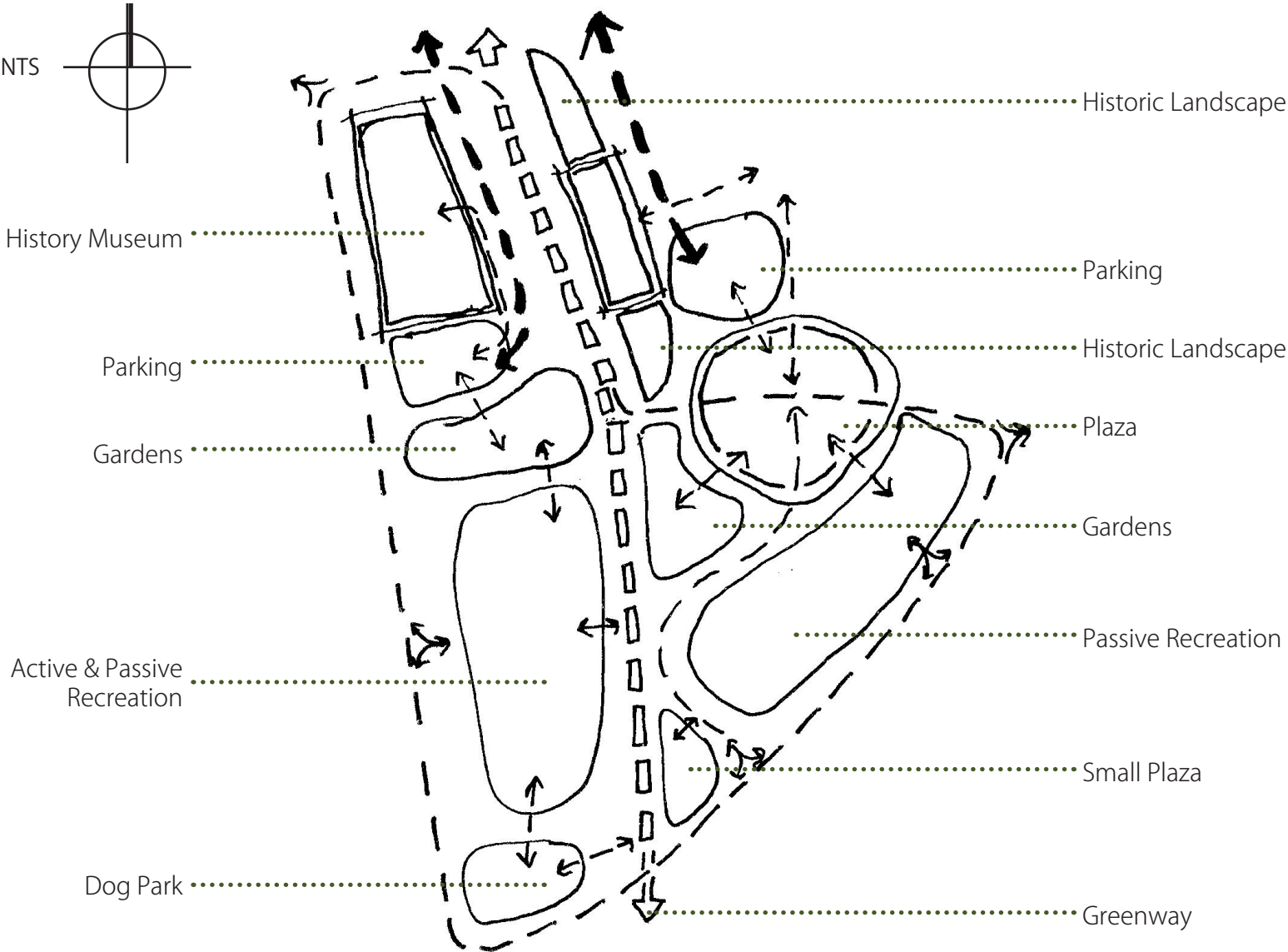


- » Use of best practice GI and LID principles
- » Water quality volume calculations ensuring cleaner water entering the Santa Cruz River
- » Use of wind and solar power
- » Use of drought tolerant plants

- » Passive rainwater harvesting basins
- » Use of low water use turf or sport turf
- » Solar and wind powered lighting
- » Recommended plants from the Pima County plant list

CONCEPT DEVELOPMENT

CONCEPT - DIVERSIONS



DIVERSIONS

Concept is focused on appealing to a wide array of users and being capable of hosting events and gatherings of all sizes. A large plaza, history museum, gardens, and recreation spaces are part of this idea.

Pros

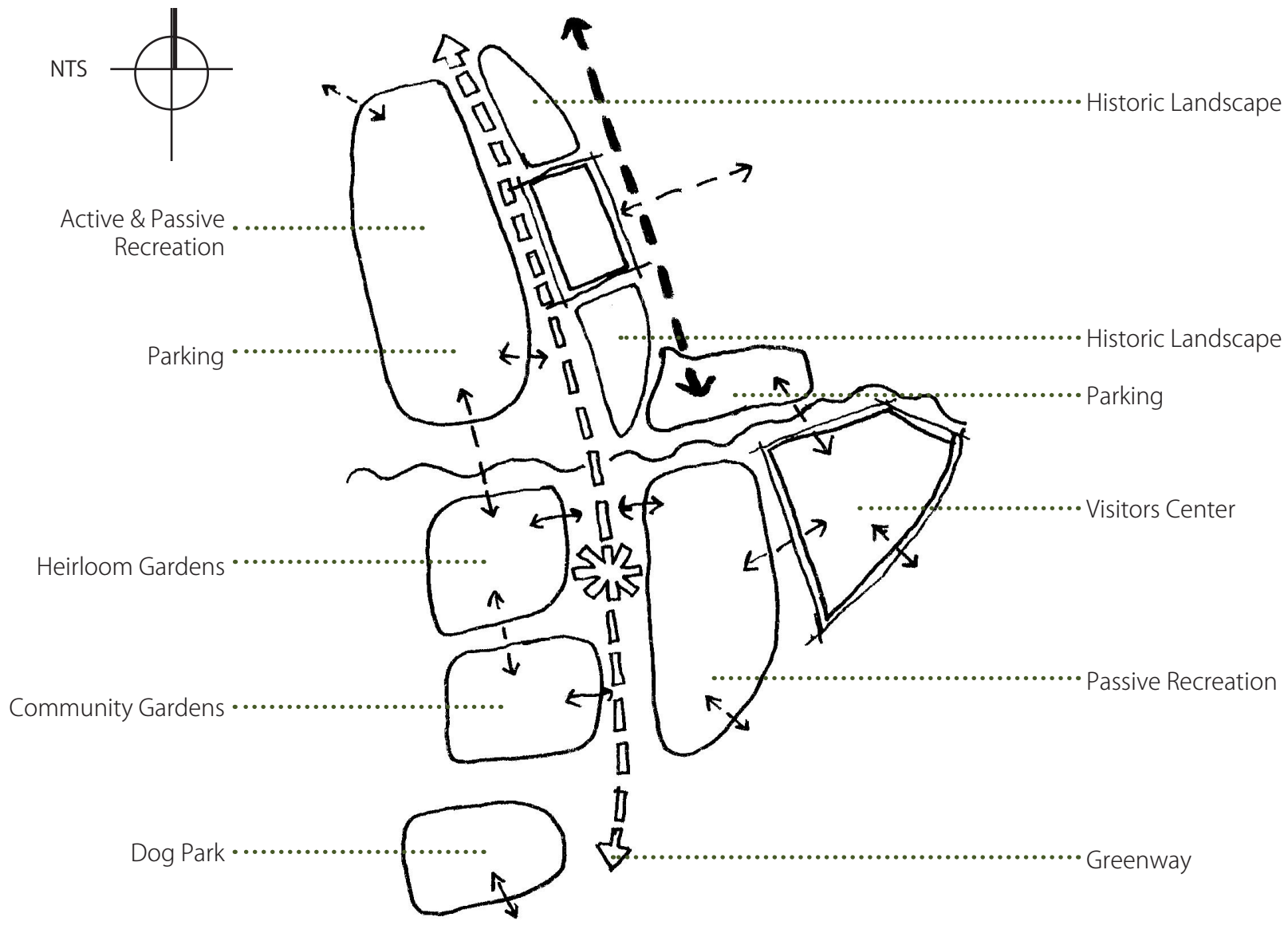
- » Athletic fields
- » 0.7 mile walking loop
- » Paths lead to existing greenway and downtown
- » Central plaza leads to historic fountain
- » Many spaces for active and passive recreation

Cons

- » Little influence from sites history
- » Noise from the Interstate impacting soccer field
- » Lack of parking for those driving in
- » Dog park close to Interstate and major street
- » Lack of diverse activities
- » Lack of parking

CONCEPT DEVELOPMENT

CONCEPT - HISTORY



HISTORY

Concept is focused on area and neighborhood history with a visitors center, community and heirloom gardens, and spaces for passive and active recreation.

Pros

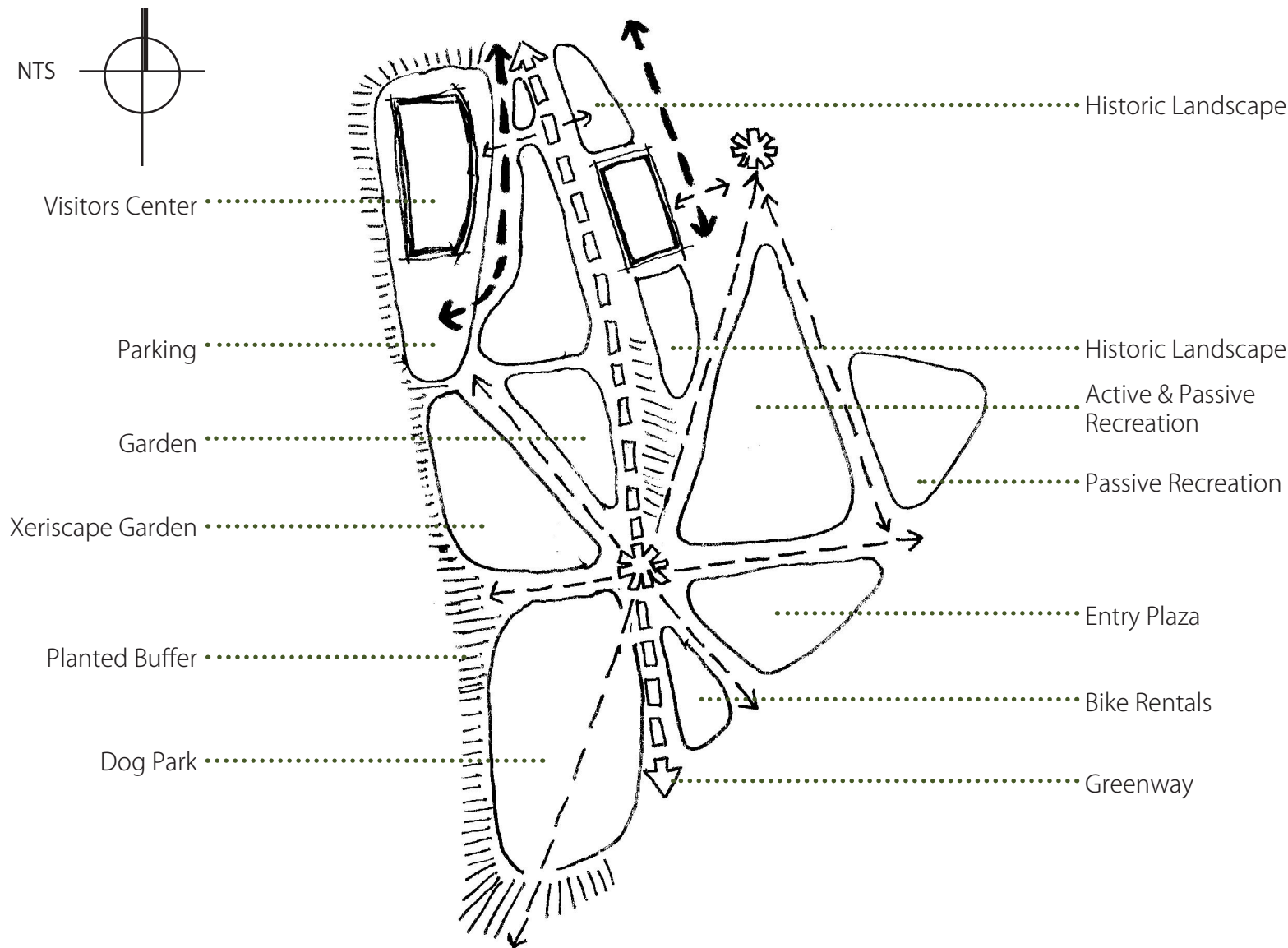
- » Athletic fields
- » Community garden plots
- » Heirloom garden plots
- » Visitors center
- » Daylighted wash

Cons

- » Visitors center may be unnecessary
- » Gardens too far from perceived users
- » Non-cohesive elements
- » Dog park too close to Interstate and major roads
- » Lack of historical references
- » Lack of parking

CONCEPT DEVELOPMENT

CONCEPT - REFERENCES



REFERENCES

Concept is focused on drawing on existing and historic patterns such as the paths radiating from the historic fountain and green space that existed where the Courthouse now resides.

Pros

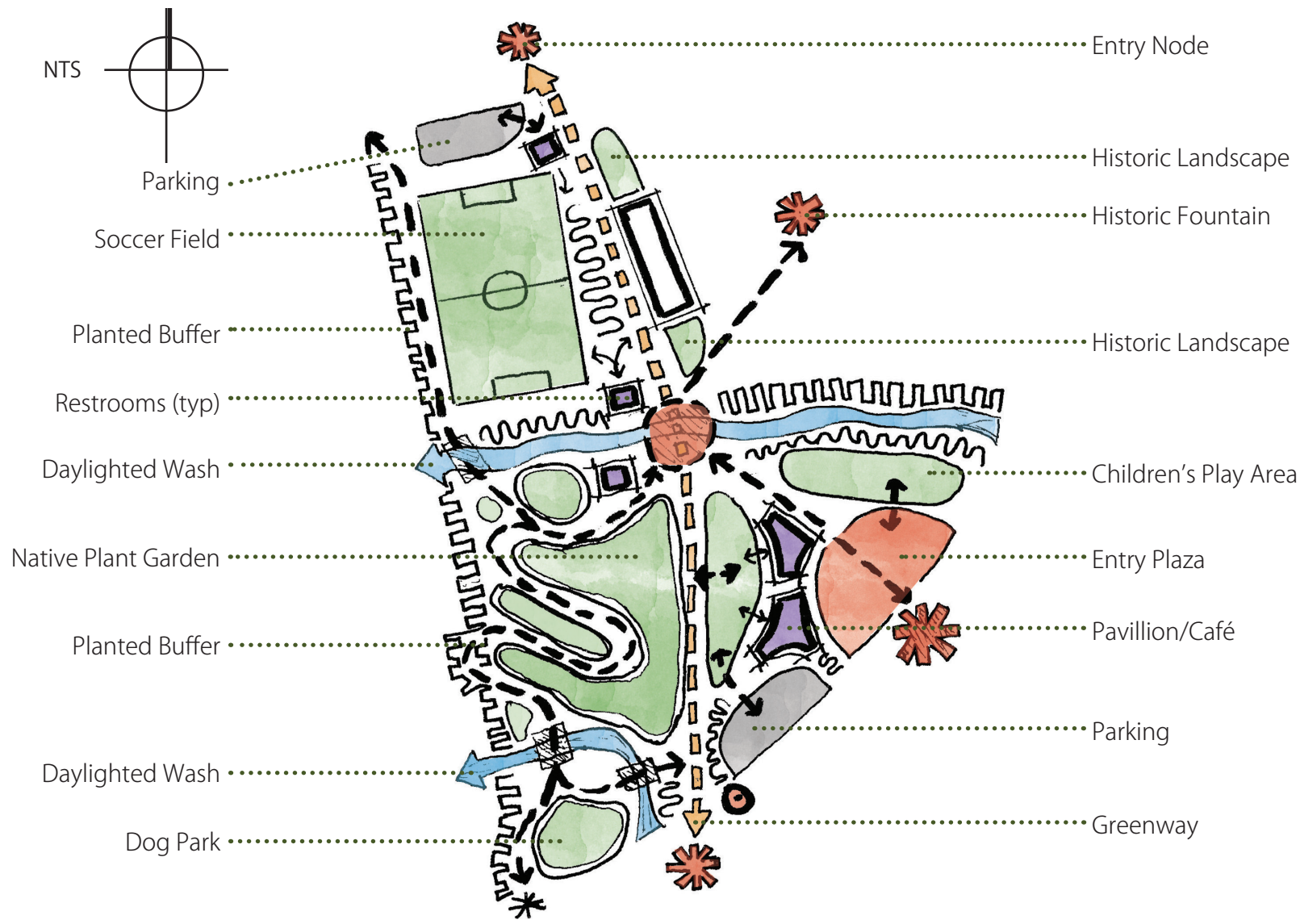
- » Paths resemble those of demolished train depot plaza
- » Visitors center
- » Ample open spaces for passive and active recreation
- » Main entry plaza
- » Variety of planted areas

Cons

- » Lack of diversity for programmed spaces
- » Awkward shaped spaces
- » Paths too formalized making for difficult spatial transitions
- » Lack of parking
- » Too many large spaces

CONCEPT DEVELOPMENT

FINAL CONCEPT - URBAN HAVEN



URBAN HAVEN

Concept is focused on appealing to a wide array of users and to keeping the space active. The soccer field can double as a large event space while the main plaza, pavillions, and children's play area will appeal to new downtown residents as well as neighborhoods to the south and east. Daylighted washes bring back a long missing natural element to the site.

Pros

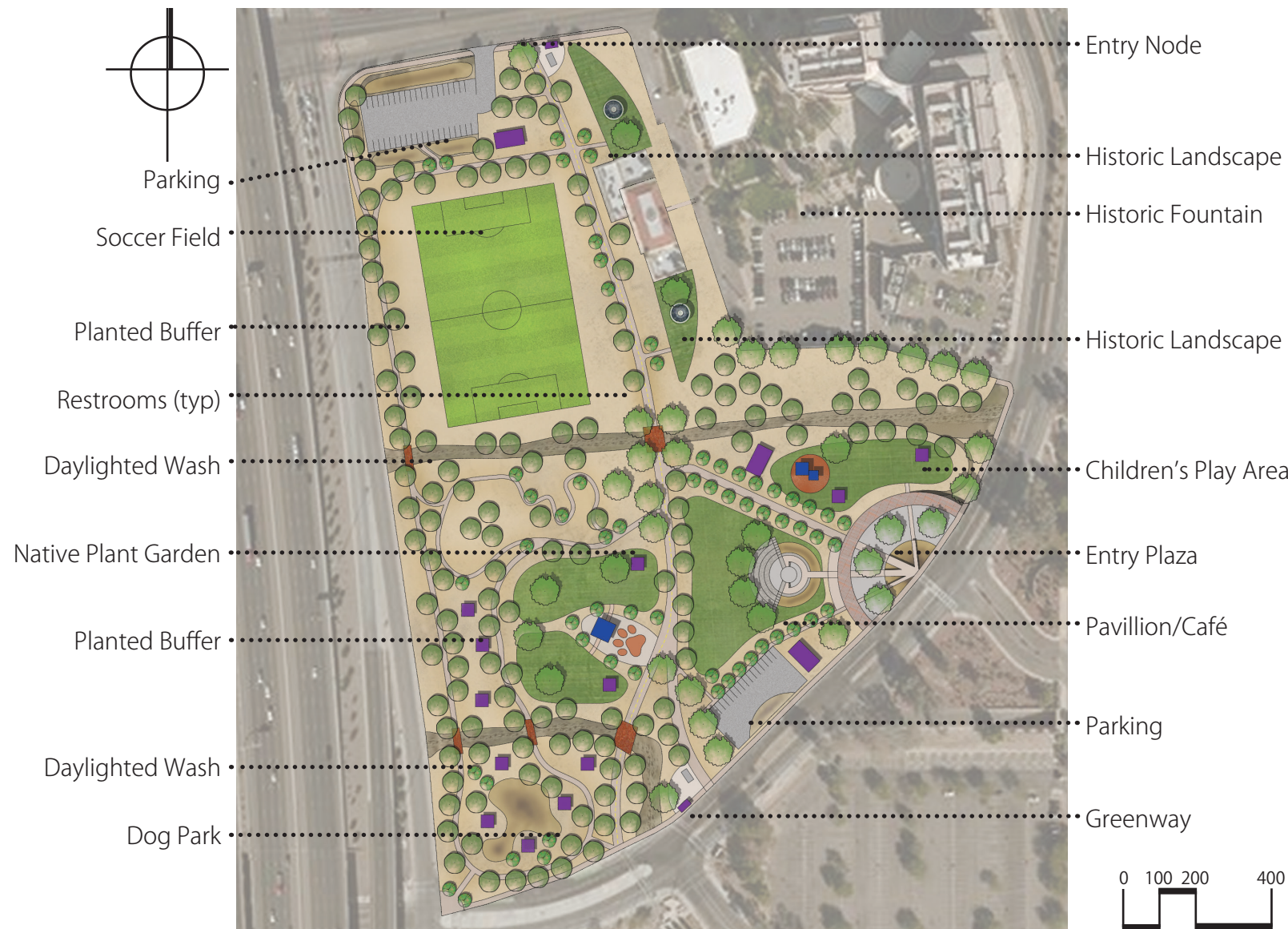
- » Better connections to downtown and the T.C.C.
- » Main entrance near SunLink stop
- » Pedestrian amenities
- » Formalized entrances
- » Daylighted washes bring natural elements back into the urban fabric
- » Appeals to diverse user groups year-round
- » Can host small daily activities and large events
- » Connected to historic depot and rail track bed
- » Adjacent to existing neighborhood and 1/4 mile walk to planned housing development at La Placita
- » Close proximity to trails and transit
- » Opportunity for Park Oriented Development

Cons

- » Displaces Gem, Mineral, & Fossil show tents
- » Slated for residential and commercial development
- » Cuts off TFD route through site
- » Noise from I-10, Congress Street, and Fire Central
- » Lack of directly adjacent residences
- » Too many large spaces

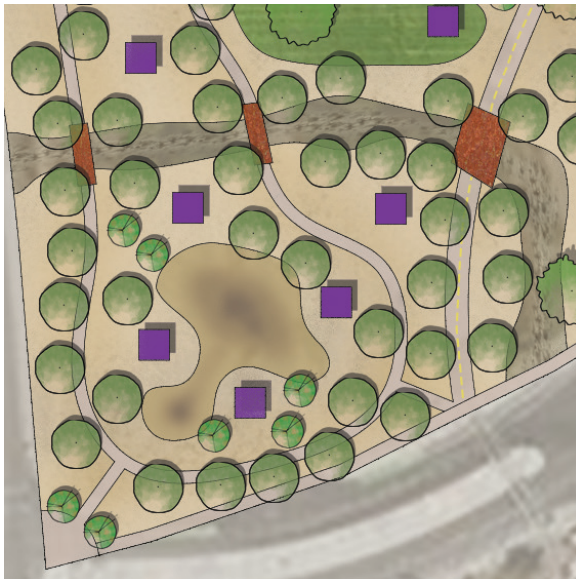
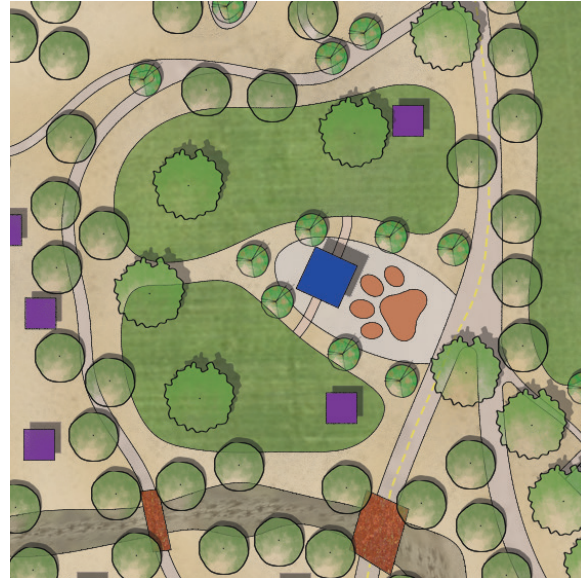
MASTER PLAN

DEPOT PARK



MASTER PLAN

DEPOT PARK

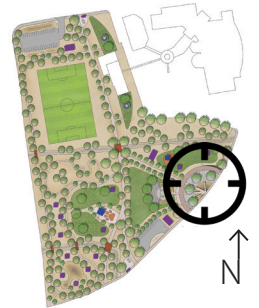


MASTER PLAN FOCUS AREAS

MAIN PLAZA



The main entry plaza off Granada Avenue features a semi-circular shade structure that emulates the architectural style of the old El Paso & Southwestern Railroad roundhouse with large steel beams holding up a pitched metal roof. The shaded plaza serves as the formal entrance to the park as well as a multi-function space suitable for events large and small. To promote sustainability the plaza features permeable pavers along with a basin capable of capturing a 0.5 inch water quality volume.

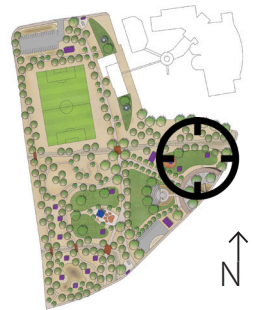


MASTER PLAN FOCUS AREAS

CHILDREN'S PLAY AREA



Walking through the entry plaza, and beyond the shade structure to the north, is a large expanse of drought tolerant turf. This open area is a space where families can enjoy Tucson's great weather all year long while engaging in passive and active recreational activities. It features large ramadas with tables and drinking fountains. Public restrooms are nearby and the tensile shade structure provides shade for the playground structures.

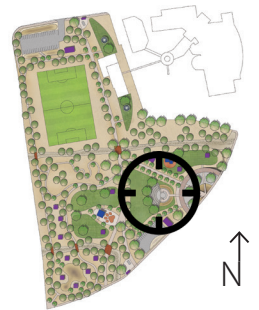


MASTER PLAN FOCUS AREAS

AMPHITHEATER



Beyond the main plaza to the west is an amphitheater and an open turf area. The entertainment venue is capable of hosting a couple hundred people. As with the main plaza the pavers, for the main paths, are permeable allowing stormwater to stay on site. Additional runoff would be captured in the basins that flank the pathways on either side of the stage. The open turf area is a multi-functional space that could be used for active and passive recreational activities as well as space for farmers markets, community events, and craft fairs amongst other events. Its location adjacent to the main plaza and along the new greenway makes it an ideal location for activities of all kinds.

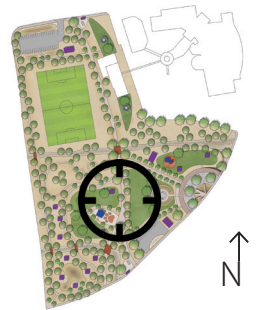


MASTER PLAN FOCUS AREAS

GREENWAY WITH PUBLIC ART



The central spine of Depot Park is the extension of the El Paso & Southwestern Greenway. Following the bed of the old rail line the greenway connects all parts of the park together. The wide path is ideal for bicyclists, walkers, runners, and dog walkers. The greenway features drought tolerant native plants that both the City of Tucson and Pima County recommend. As with many new projects a certain percentage of the cost of the park would be set aside for public art. This section features art that recalls the railroading history of the park. It emulates the motion of an old locomotive wheel being driven by a connecting rod.

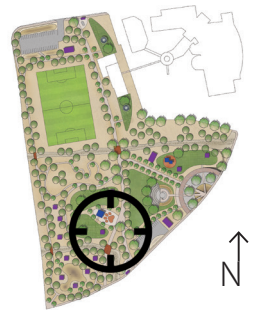


MASTER PLAN FOCUS AREAS

DOG PARK



To the west of the greenway is a dog park. The dog park features an entry plaza, with a paw print motif, leading to a central shade structure featuring park information, seating, drinking fountains, and paths leading to two fenced in areas for large and small dogs. Each area features rugged drought tolerant turf, pet safe vegetation, shade trees, and ramadas. The ramadas have seating as well as drinking fountains for people and their canine pals.



MASTER PLAN FOCUS AREAS

SUNLINK STOP WITH BIKE RENTAL



Near the existing SunLink stop along Granada Avenue is a small plaza featuring bicycle rentals. Park or others users wishing to explore the city via pedal power can pay to rent a bike at the solar powered kiosk. From there they can ride along the El Paso & Southwestern Greenway, along any of the bike routes surrounding Depot Park, or take the short ride west underneath I-10 to The Loop. Stormwater from this space is directed toward the existing wash to the west.



MASTER PLAN FOCUS AREAS

CUSHING STREET / FRONTAGE ROAD ENTRANCE



At the intersection of W. Cushing Street and S. Freeway in another formal entrance to Depot Park. This entrance serves those walking in from points west or the residential areas to the south. The inviting plaza features desert adapted plants, shade, permeable pavers, and a sign adapted from the train depot. Beyond the plaza are a series of large ramadas featuring shade, table seating, and drinking fountains. It also connects walkers to a 0.5 mile loop trail where they'll encounter GI and LI best practices, benches, native plants, and placards denoting site history.



DETAILS

PERMEABLE PAVERS, LIGHTING, AND MONUMENT SIGNAGE



<http://www.illumient.com/index.html>

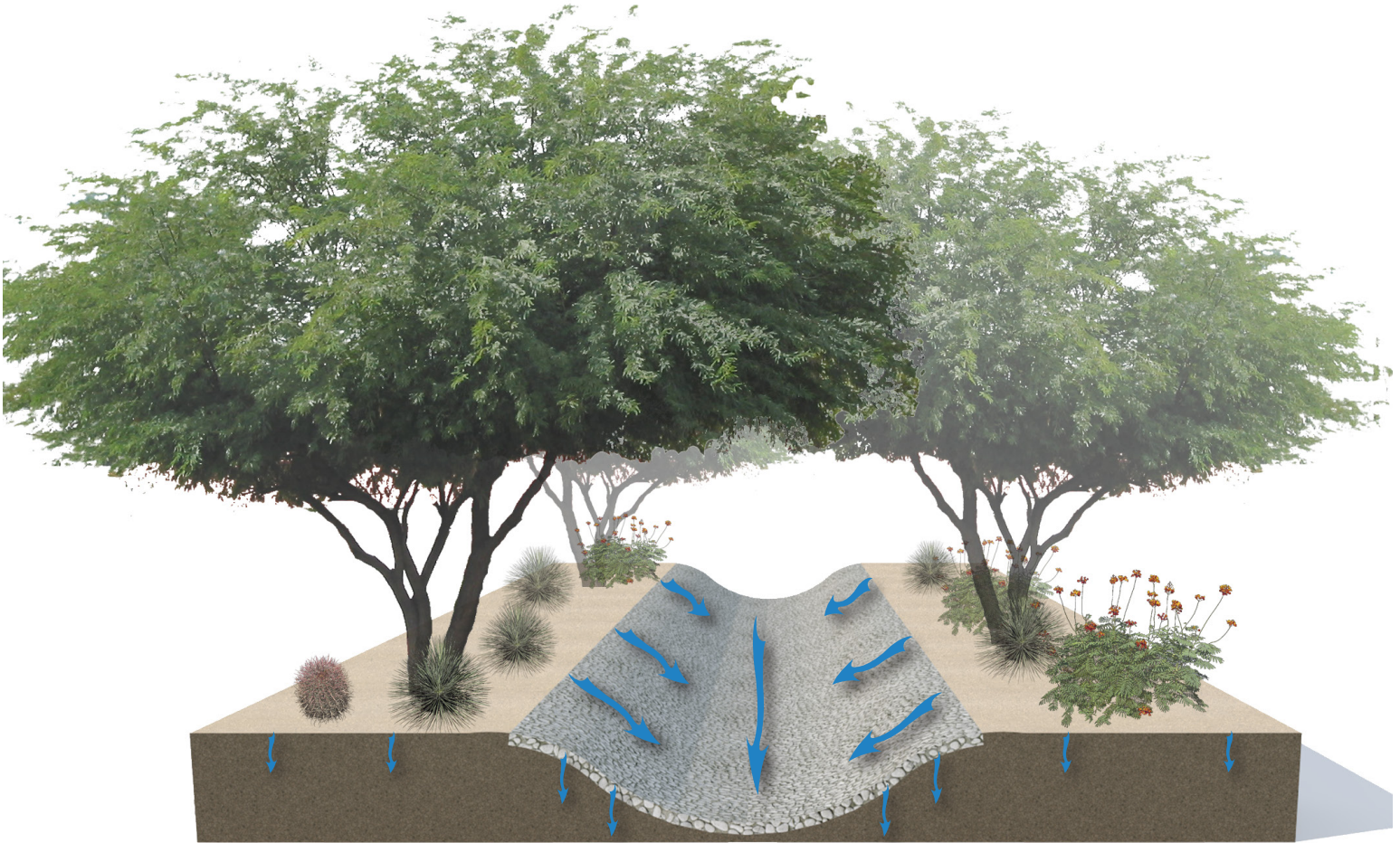
Monument sign at all major park entrances. It emulates the sign found atop the El Paso & Southwestern Depot



Wind and solar powered lighting promotes sustainability while taking full advantage of each renewable resource. The post is also capable of offering a public WiFi signal.

DETAILS

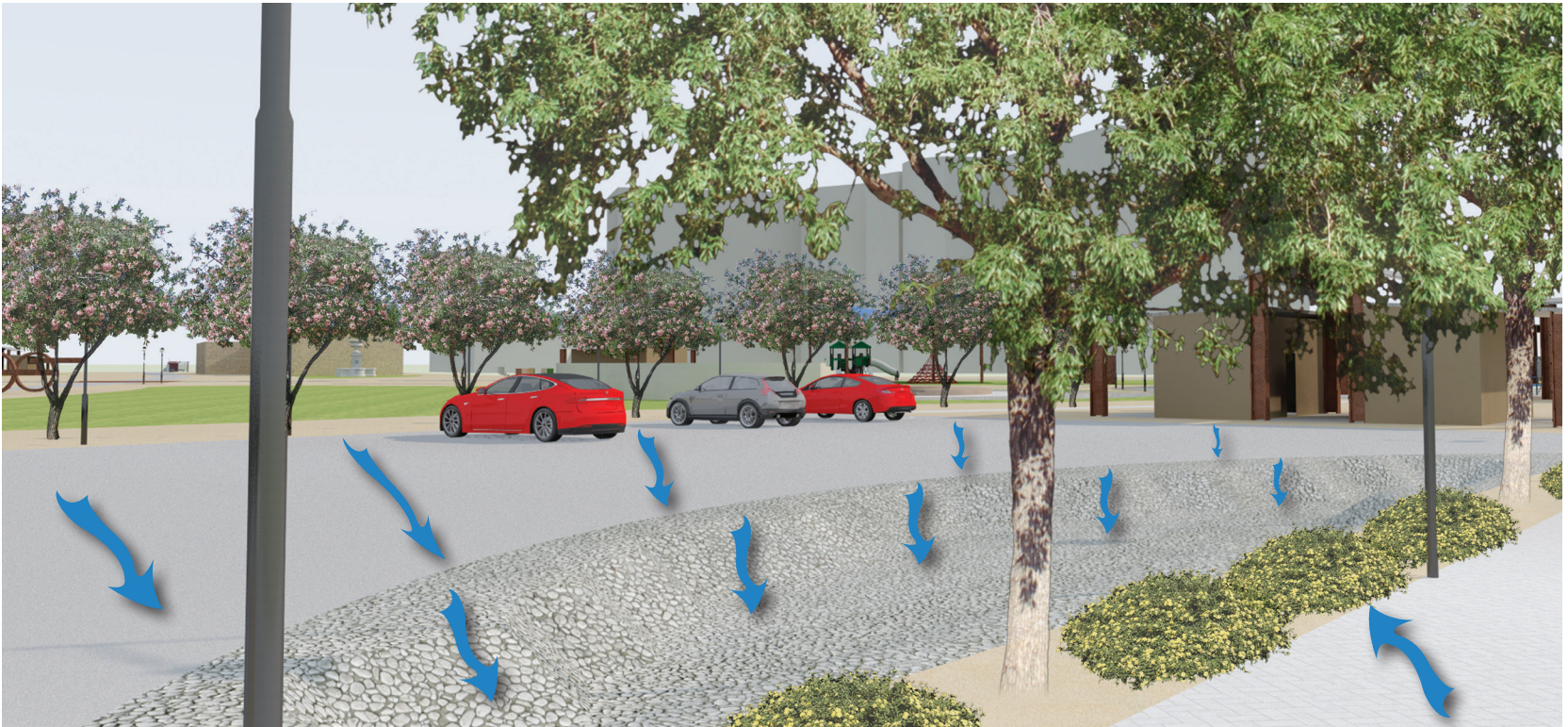
WASH DETAIL



Crushed onsite concrete is reused in washes to slow flow, reduce erosion, and promote stormwater infiltration.

DETAILS

PARKING LOT STORMWATER BASIN DETAIL



Stormwater is captured from both onsite parking lots. Water quality volumes are calculated for each basin or set of basins to ensure that at least 0.5" - 1.0" of stormwater runoff can be detained on site.

This parking lot, along Granada Avenue, is approximately 9,700 ft².

The water quality volume based on 0.5" is 404ft³.

A basin depth of 6" exceeds the needed depth by 3".

A 6" deep basin could handle a 1" water quality volume or high intensity monsoon stormwater event.

WATER QUALITY VOLUMES AND BASIN SIZING



① Congress Street Parking Lot

Lot = 18,000 ft²
Basins = 8,155 ft³

0.5" WQv = 750 ft³ Basin Depth 1"
1.0" WQv = 1,500 ft³ Basin Depth 2"

② Amphitheater

Amphitheater = 7,175 ft²
Basins = 2,300 ft³

0.5" WQv = 300 ft³ Basin Depth 1"
1.0" WQv = 600 ft³ Basin Depth 2"

③ Granada Avenue Entrance Plaza

Plaza = 19,000 ft²
Basins = 3,800 ft³

0.5" WQv = 792 ft³ Basin Depth 2.5"
1.0" WQv = 1,583 ft³ Basin Depth 5"

④ Granada Avenue Parking Lot

Lot = 9,688 ft²
Basins = 1,562 ft³

0.5" WQv = 404 ft³ Basin Depth 3"
1.0" WQv = 807 ft³ Basin Depth 6"

Basin depths above are the minimums. Typical basins are 6"-12" deep. The park basins are designed to accommodate more stormwater.

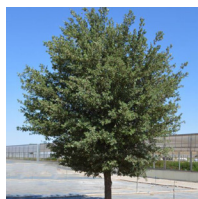
Area of each impervious area * allowed runoff depth = WQv
(note 0.5" = 0.041667") (WQv = Water Quality Volume)
WQv / (Length*Width of impervious surface) = Depth of basin

SUGGESTED BASIC PLANT PALETTE

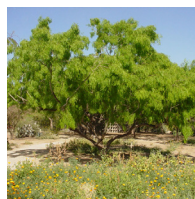
TREES



Parkinsonia 'Desert Museum'
Desert Museum Palo Verde



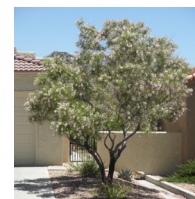
Quercus fusiformis
'Joan Lionetti'
Joan Lionetti Live Oak



Prosopis glandulosa
Honey Mesquite



Prosopis velutina
Velvet Mesquite



Chilopsis linearis
Desert Willow

SHRUBS



Fouquieria splendens
Ocotillo



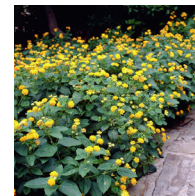
Leucophyllum
laevigatum
Chihuahuan Rain Sage



Caesalpinia
mexicana
Mexican Bird of Paradise



Caesalpinia
pulcherrima
Red Bird of Paradise



Lantana camara
Lantana

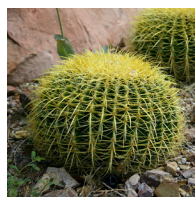
CACTI & SUCCULENTS



Hesperaloe
parviflora
Red Yucca



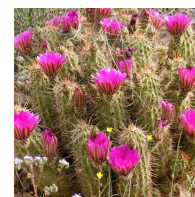
Agave vilmoriniana
Octopus Agave



Echinocactus
grusonii
Golden Barrel



Carnegiea gigantea
Saguaro

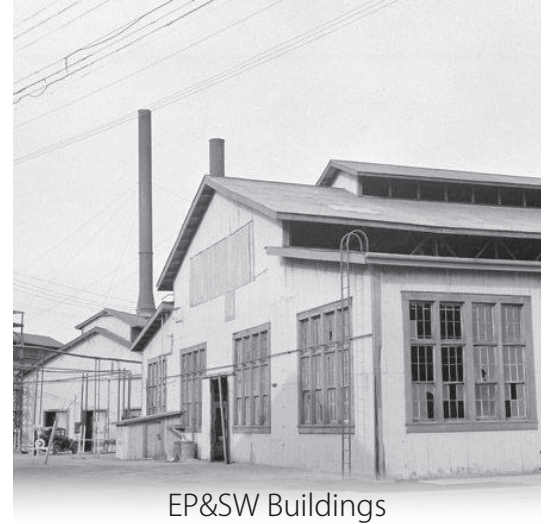


Echinocereus
engelmannii
Strawberry Hedgehog

For additional or alternative naturally occurring native plants, common to this area, use the Pima County Native Plant Tool (T14S R14E) for guidance. <http://webcms.pima.gov/cms/One.aspx?portalId=169&pageId=52688>

DESIGN INSPIRATIONS

TPOLOGY

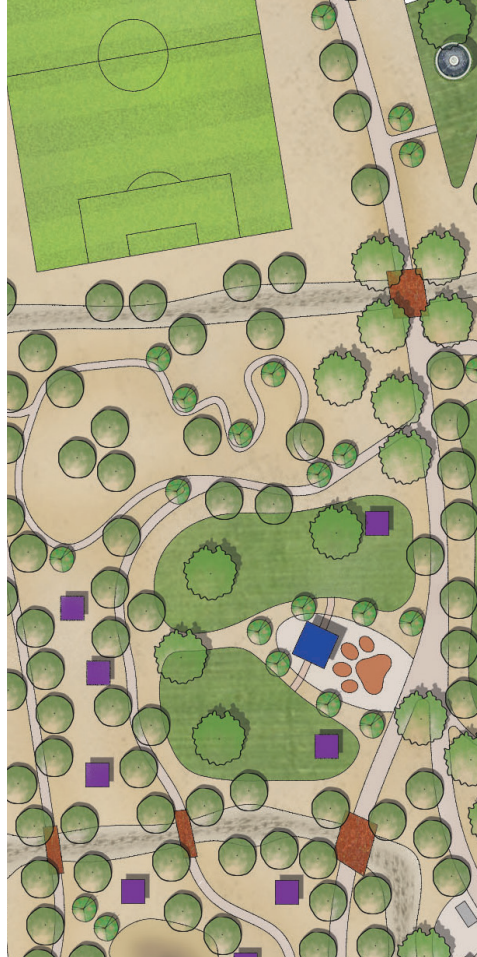


CONCLUSIONS



- » The design calls upon the railroad history of the site while incorporating the El Paso & Southwestern Depot back into the park.
- » Daylighted washes bring back a long lost natural element while serving as a filter for stormwater runoff before it drains into the Santa Cruz River to the west.
- » The park caters to a wide array of users.
- » Depot Park is a major stop along the El Paso & Southwestern Greenway as it continues through the site.
- » All the paved surfaces drain into adjacent basins to keep stormwater on site while filtering it.
- » Improved and defined circulation patterns make it easy for pedestrians to navigate the park.
- » The park takes advantage of the numerous methods of reaching the site through public transportation, personal vehicle, bicycle, and on foot.

SUMMARY



With the growing interest in downtown Tucson and urban infill projects, available open space is becoming scarce. I suggest that the lack of open space could make living in or near downtown less appealing for residents and event planners alike. The goal of this document was to demonstrate a park adjacent to downtown Tucson that would be viable part of the future development and reinvigoration of downtown. It should be developed and designed in a way that actively and passively informs park users of the importance of sustainable practices in an urban setting and sets a precedent for future park development both in the city and the region. With changes in climate and the growing costs of energy and infrastructure, a new approach should be taken to ensure park design that can seamlessly adapt to these changes. Through site visits, analysis, literature and case reviews, and design interventions, Depot Park is intended to serve as a model for modern urban park design in an arid region.





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Photos not referenced were taken by Jon Marenfeld

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- Page 92** - EPSW roundhouse, RxR building - https://www.tucsonaz.gov/files/bicycle/FINAL_El_Paso_Greenway_Site_Analysis_Report.pdf
- Page 92** - Doc Cavalliere Park art - <http://livebetterinscottsdale.com/wp-content/uploads/2013/10/park-design.jpg>
- Page 92** - Pantano River Park - https://webcms.pima.gov/UserFiles/Servers/Server_6/Image/News%20-%20Play/130212-Loop-Pantano-River-Park-p13.jpg
- Page 92** - Bark Park - <http://www.landscapeonline.com/research/lasn/2011/03/img/20749/20749-7.jpg>

SOFTWARE & HARDWARE USED

AutoCAD 2016

ArcGIS 10.2.2

Google Earth Pro

Sketchup Pro 2016

Sketchup Podium Rendering v2.5.116

Microsoft Word 2013

Microsoft Excel 2013

Microsoft PowerPoint 2013

Adobe Photoshop CS6

Adobe Illustrator CS6

Adobe Indesign CS6

Smart Tools Sound Meter v1.6

Samsung Galaxy S6 Edge

Canon PowerShot SX260 HS with GPS tagging enabled

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