

# West Pennway Streetscape Plan

CITY OF FOUNTAINS  
HEART OF THE NATION



KANSAS CITY  
MISSOURI



# Acknowledgements

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Monica Banks	Villa del Sol
Vonda Jensen	Land Owner
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GREENWOOD BAPTIST CHURCH



WESTSIDE COMMUNITY GARDEN



IRENE H. RUIZ BIBLIOTECA



TONY AGUIRRE COMMUNITY CENTER

## Introduction

West Pennway Parkway was formerly designated Alternate US 40 before construction of I-670. Now after completion of the Interstate system and decades of an organic Westside Neighborhood resurgence, neighborhood values and character have begun to reshape streets in the Westside to be multi-modal and context sensitive. The Riverfront Heritage Trail, Jarboe Park and enhancements such as limestone structures, public art and transit shelters line West Pennway Parkway. Increased pedestrian activity to the Tony Aguirre Community Center, the Ruiz Public Library, Alta Vista Charter High School and Primitivo Garcia Elementary School are important considerations for this project.

In April of 2011, a multi-disciplinary design team led by el dorado inc was selected by the Kansas City Department of Parks and Recreation to develop streetscape improvements for the portion of West Pennway between 17th and 21st Street. The project is City of Kansas City, Missouri, Project Number 70112208. West Pennway is a signature piece of Kansas City's historic Parks and Boulevards system, a 50' wide parkway lined with hundred-year-old London Plane trees. It's surrounded by buildings, stone walls, and pieces of parkland that also date back to the turn of the century.

The team was tasked with improving the way that West Pennway functions. They examined effective, environmentally sound ways to manage the large amounts stormwater that flow down from steep terrain on both sides of West Pennway. Their primary focus was on improving the safety of intersections and crosswalks, encouraging all forms of transportation—walking, cycling, driving and riding alike. The streetscape design also took into account West Pennway's place in the larger context of the Parks system, celebrating and retaining the heritage of the Parks and Boulevards system while adapting it to meet present-day needs. Improved connections with other parks, unique park features, bike and recreational trails were explored.

## introduction



JARBOE PARK RIBBON CUTTING



PUBLIC MEETING #2



BACK TO SCHOOL PEP RALLY



WEST PENNWAY PROJECT WEBSITE

## Community Engagement

The Westside Neighborhood is one of Kansas City's most diverse and culturally rich urban neighborhoods. Given its proximity to downtown Kansas City, inspiring topography and connection to the Parks and Boulevard system it has experienced and will continue to experience intense development interest. Acknowledging the sensitivity of this fact extra efforts were made to ensure a broad range of opportunities for public participation and awareness in this planning process. Outreach efforts included:

- Three Stakeholder and Technical Committee meetings over the five months of planning and design
- Two open, public meetings with notification distributed by email, by flyer and by word-of-mouth
- Six walkabouts where Stakeholders and the general public interacted directly with the consultant team on site
- Jarboe Park Ribbon Cutting – Questionnaire distributed asking what people like about West Pennway and what they would change if they could.
- KCMO Back to School Pep Rally
- KCMO School District Repurposing Meeting for Douglass, Switzer Annex and Switzer-West
- One weekend door-to-door walkabout with Parks Commission Chair and Westside resident Jean Paul Chaurand
- Regular progress reports posted on Westside Community Action Network's website - <http://www.westsidecan.org/>
- Dedicated project website – [www.westpennway.com](http://www.westpennway.com)
- el dorado inc website – [www.eldo.us](http://www.eldo.us)





## Project Goals

The overall goals of the West Pennway Streetscape project parallel those of the Greater Downtown Area Plan (GDAP). They are:

- Create a walkable downtown.
- Double the population downtown.
- Increase employment downtown.
- Retain and promote safe, authentic neighborhoods.
- Promote sustainability.



## 1.1 Precedent Analysis

As we began the design process, we researched similar projects happening globally, nationally, and right here in Kansas City.

The purpose of a precedent analysis is to take a snapshot of similar projects occurring elsewhere. We are looking for ideas that will help inspire the design team, the stakeholders and the stewards of West Pennway as we look to the creation of a 21st Century Parkway. Projects range from on-site stormwater management examples to wayfinding to park design, some are current while others are historical.



**Bikeway Belem** | Lisbon, Portugal

P-06 Atelier





**Tanner Springs Park** | Portland, OR  
Atelier Dreiseitl







**18 Broadway** | Kansas City, MO  
360 & Patti Banks Associates



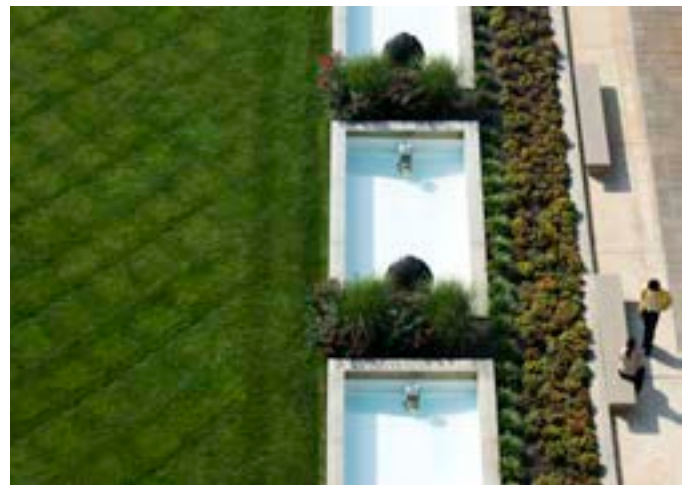
**Water Playground** | Pforzheim, Germany  
Atelier Dreiseitl



**20th Street Streetscape** | Kansas City, MO  
el dorado architects

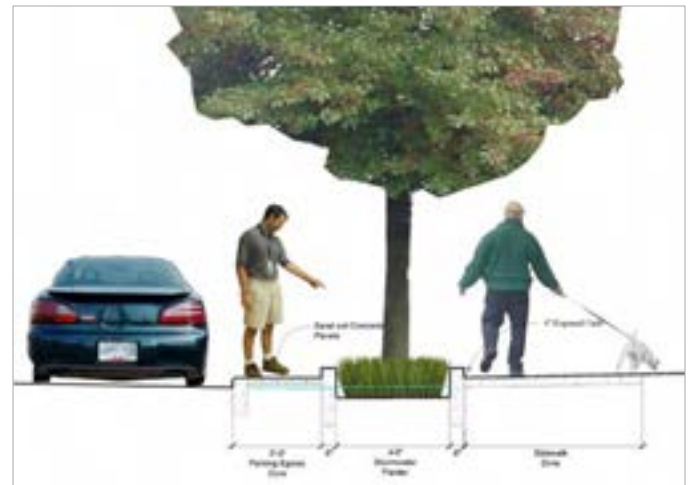


pre-design



**12th Street Streetscape** | Kansas City, MO  
BNIM





**SW 12th Avenue Green Street** | Portland, OR

Kevin Robert Perry



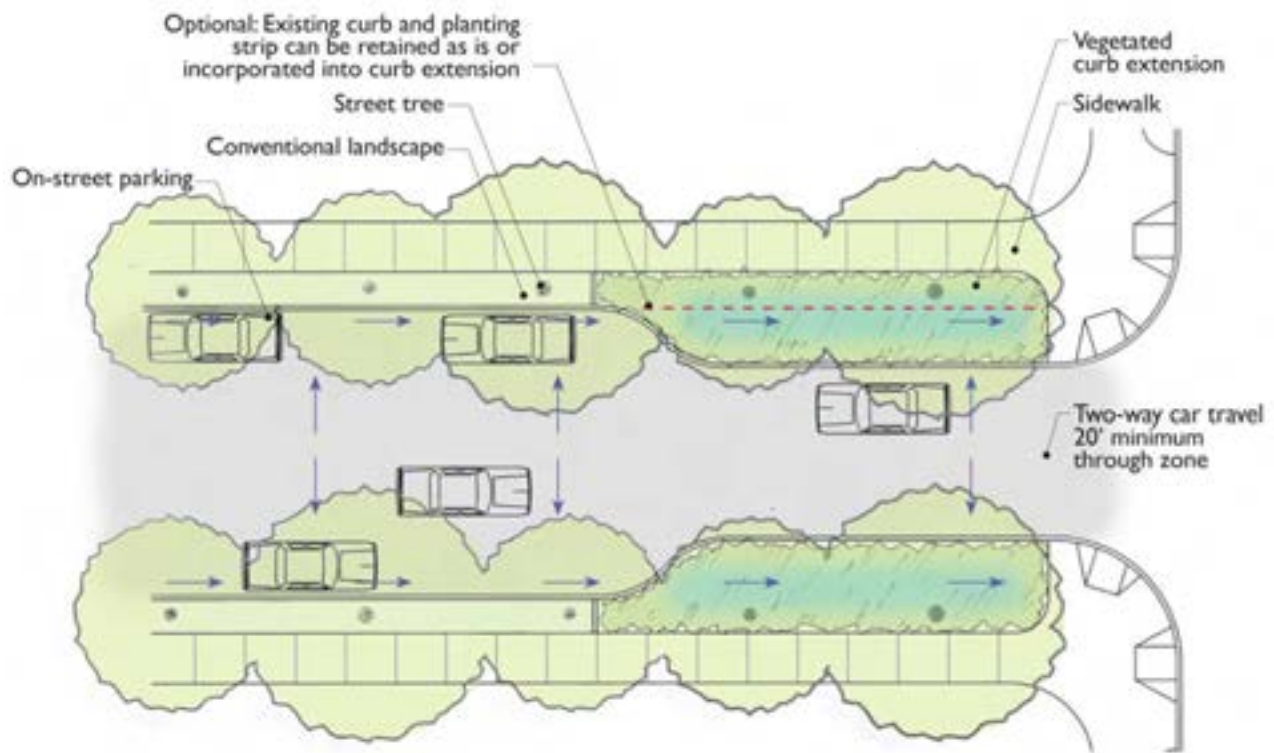
## pre-design



**Toppilansaari** | Oulu, Finland  
Atelier Dreiseitl



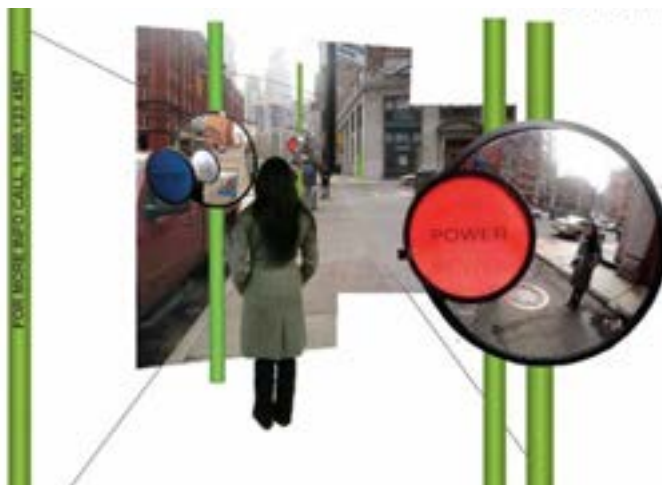




**Stormwater Curb Extension at Intersection Plan View**



## pre-design



**Broadway: 1000 Steps** | New York, NY  
Mary Miss





## 1.2 Site Analysis

Before we began any design work on West Pennway, we assessed the current condition of the roadway, sidewalks, and surrounding landscape. We took into account the resources present in and around the project site, as well as liabilities to address. The following diagrams are a visual representation of our site analysis.





## Parkland



1. Andrew Dripps Park
2. Jarboe Park
3. Westside CAN Center  
Community Garden/  
Switzer Neighborhood  
Farm
4. Irene H. Ruiz Library Lawn
5. Observation Park
6. Tony Aguirre  
Community Center
7. Gage Park
8. Triangle Park
9. Westside Orchard &  
Berry Patch



## Global Parameters





## Project Site





## Historic Structures



1. Kersey Coates Wall  
1912
2. Greenwood Church  
1927
3. 18th & Madison Steps  
1912
4. Switzer School Buildings  
1899
5. Observation Park Steps  
1910
6. Observation Park Wall  
1910
7. Southwest Tabernacle  
Congregational Church  
1888

# Sidewalk Conditions



- New/Good Condition
- Fair Condition
- Poor Condition






## Poor Curb Conditions





## Pedestrian Crossings



-  Well-Marked Crossing
-  Unmarked Crossing
-  Dead-end Crossing



## Neighborhood Amenities



### Community Functions

1. Tony Aguirre Center
2. Irene H. Ruiz Library
3. Richard Cabot Clinic

### Schools

5. Primitivo Garcia Elementary
6. Alta Vista School

### Religious Centers

7. Greenwood Baptist Church
8. Rime Buddhist Center

### Retail/Commercial



## Tree Locations





## Traffic Density



## Entry Points





## One-Way Streets






## Confusing Intersections





## Trail Systems



-  Metro Green Trail
-  Riverfront Heritage Trail Complete
-  Riverfront Heritage Trail Unfunded

# KCMO Bicycle Routes



- Phase I
- Phase II





## Public Art



1. NeoMellenic Pedestrian Lighting
2. Westside Pequeño Miramide
3. Westside Transit Oasis





## Wayfinding Signs



# Parking Lot Locations





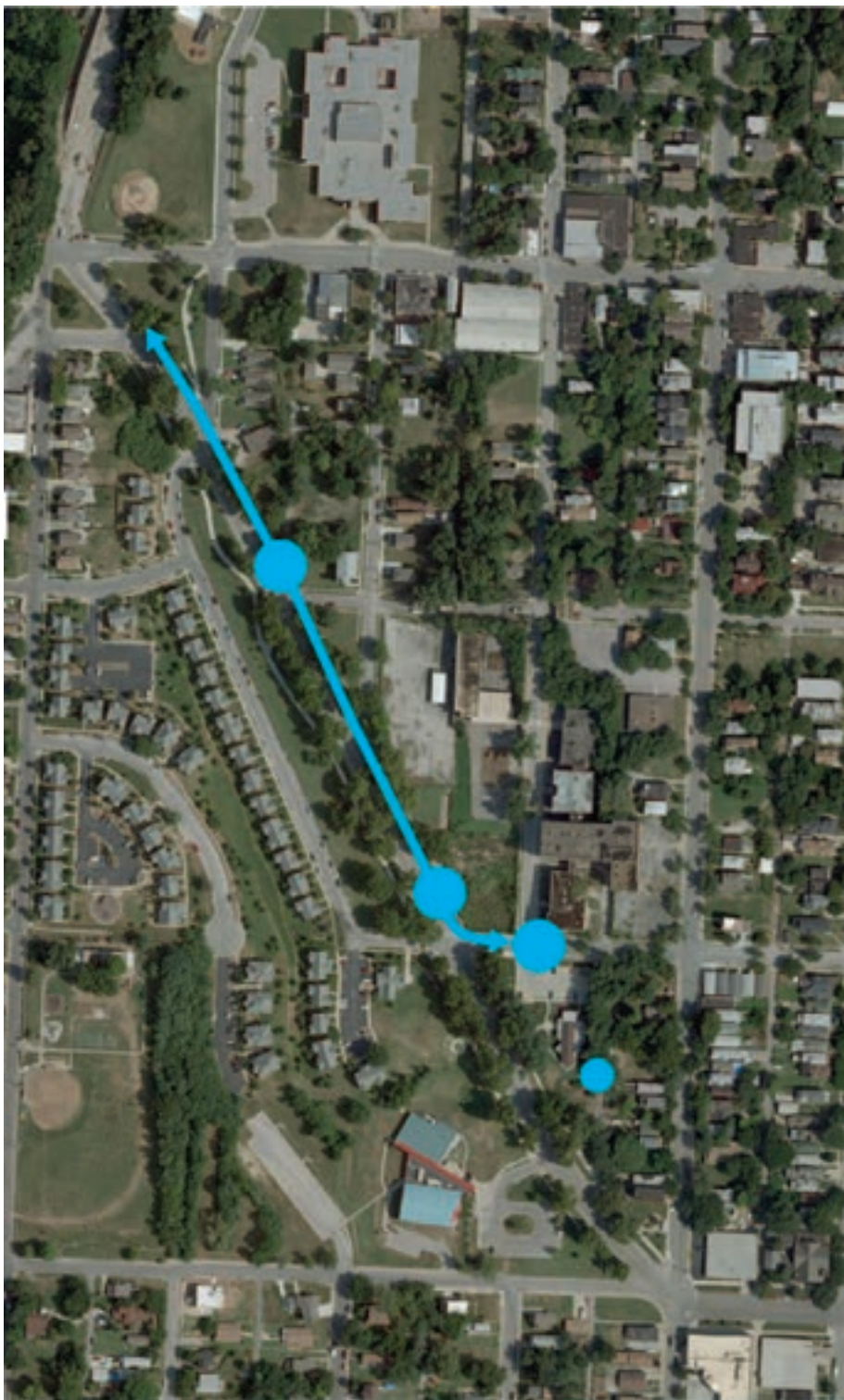
## Stormwater Inlets



● Functioning Inlets

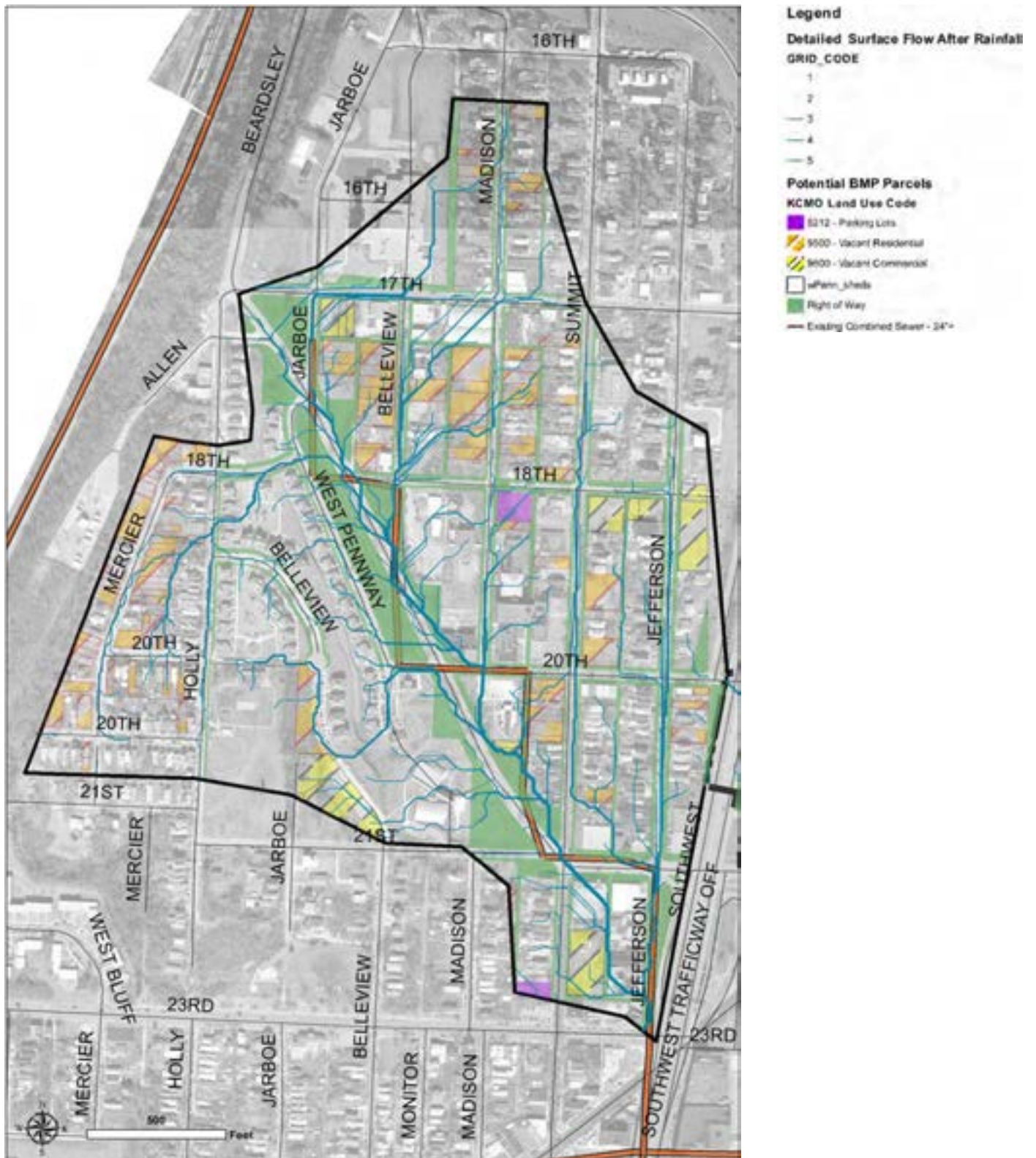
● Collapsed Inlets

## Trouble Drainage Spots





# Topographical Water Flow



Location in Parks & Boulevards System



MAP OF KANSAS CITY: APRIL 1910



MAP OF WEST PENNWAY: 1925





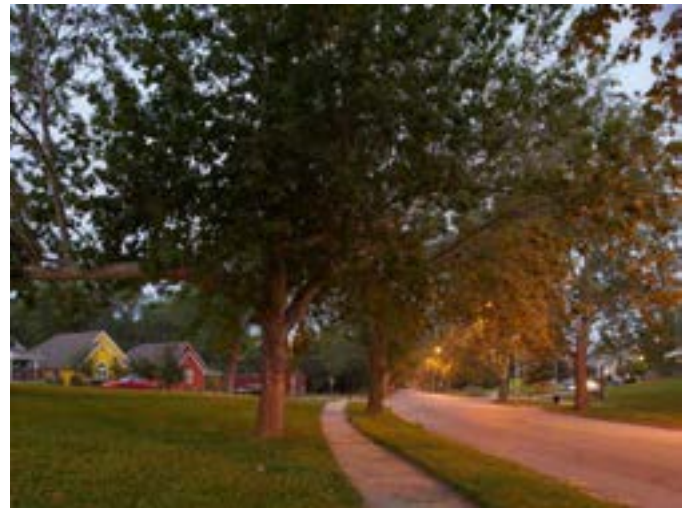
SOUTHWEST FROM 18<sup>TH</sup> & MADISON: 1908



SOUTHWEST NEAR 18<sup>TH</sup> & MADISON: 2011



SOUTHEAST FROM 17<sup>TH</sup> STREET: 1912



SOUTHEAST NEAR 17<sup>TH</sup> STREET: 2011



SOUTHEAST FROM 17<sup>TH</sup> STREET: 1912

pre-design



KERSEY COATES DRIVE



BEARDSLEY ROAD: 2011



KERSEY COATES DRIVE: 1938



BEARDSLEY ROAD: 2011



KERSEY COATES DRIVE



WEST TERRACE PARK







SOUTHEAST FROM 17<sup>TH</sup> & HOLLY: 1911



SOUTHEAST FROM 17<sup>TH</sup> & HOLLY: 2011



EAST FROM 21<sup>ST</sup> & SUMMIT: 1911



EAST NEAR SUMMIT & WEST PENNWAY: 2011



EAST FROM 21<sup>ST</sup> SUMMIT: 1908



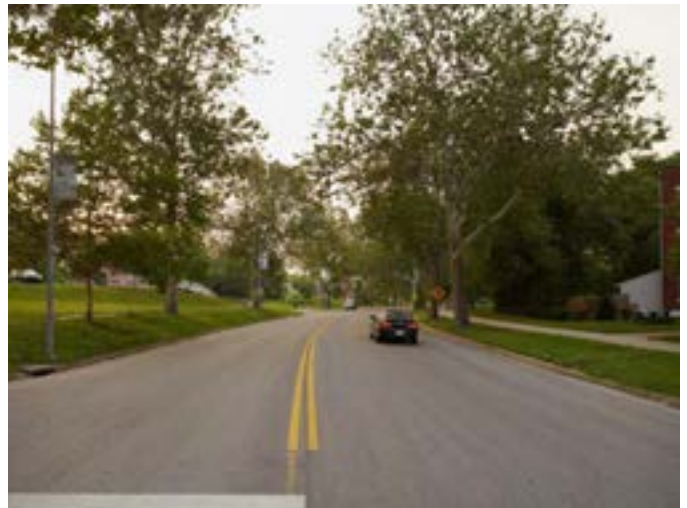
NORTHWEST FROM 21<sup>ST</sup> & SUMMIT: 1908



NW ON 19<sup>TH</sup> BETWEEN PROSPECT & MADISON: 1908



NORTHWEST FROM MADISON: 1912



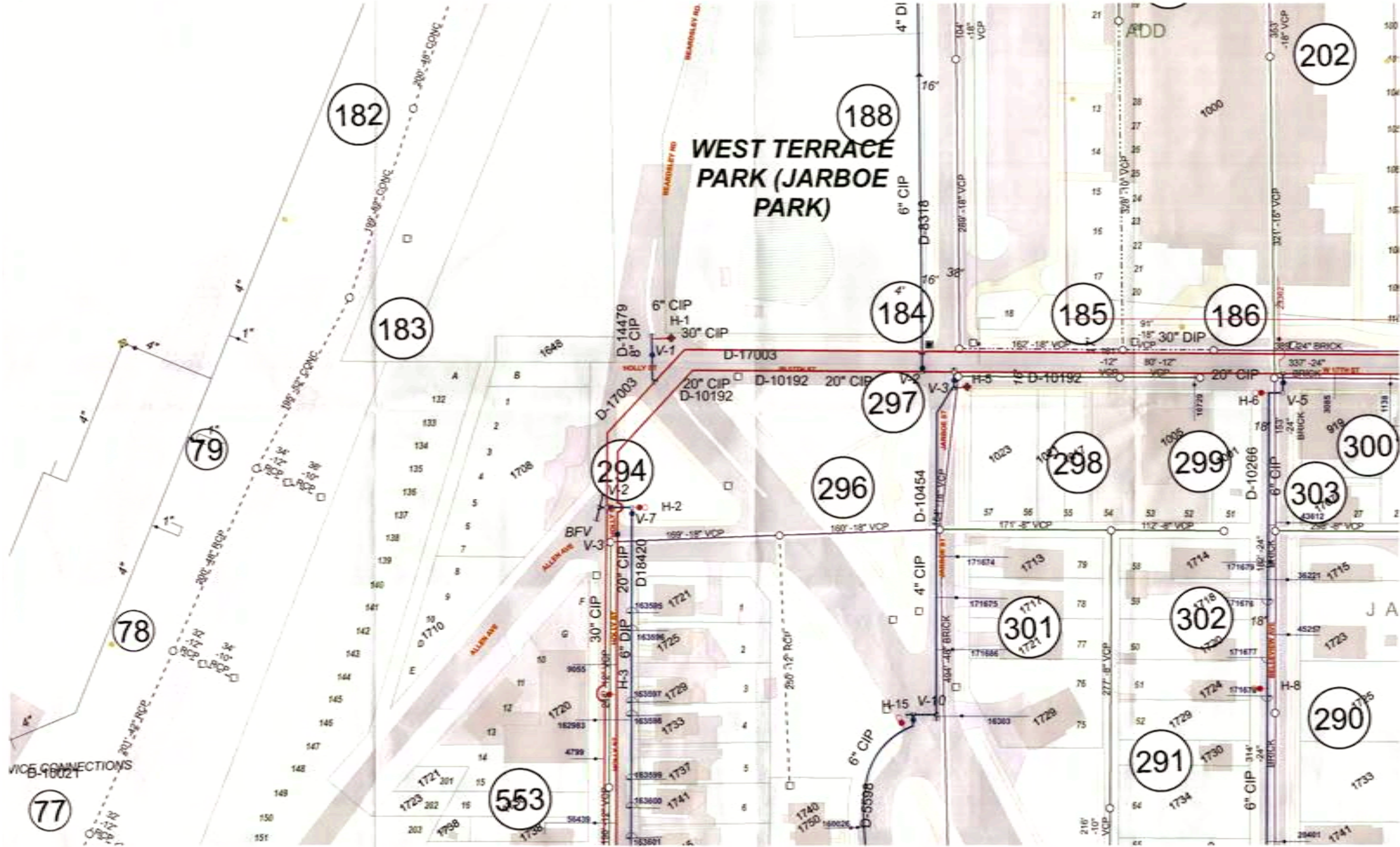
NORTHWEST ON WEST PENNWAY: 2011



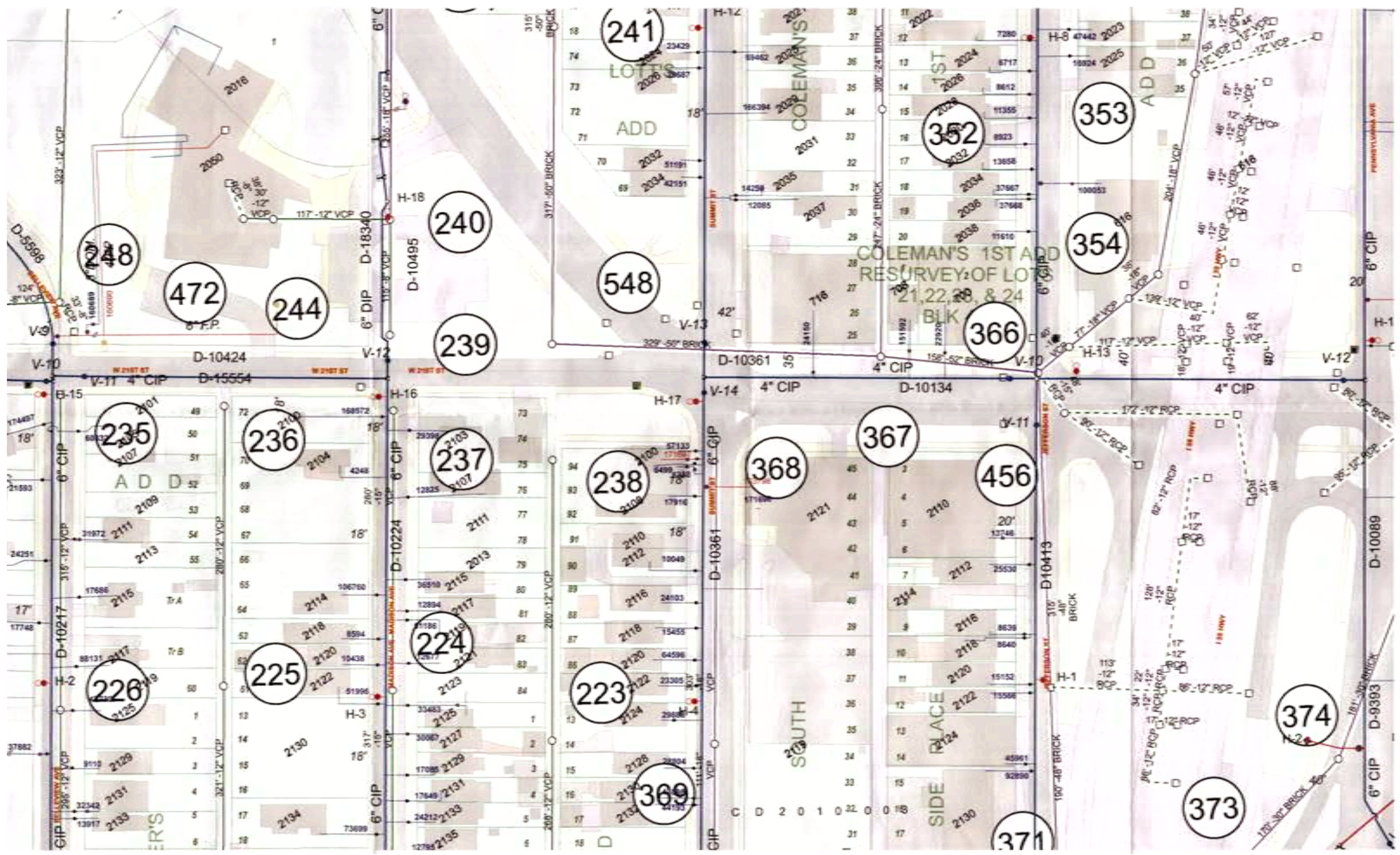
NW ON 19<sup>TH</sup> BETWEEN PROSPECT & MADISON: 1908











West Pennway/Summit/21<sup>st</sup> Street - Water & Sewer Map











## Sewer Atlas Map - West Pennway



## 3.1 Schematic Design

The Schematic Design phase included a number of important conceptual developments, all in support of the project goals. One was the notion that West Pennway be thought of as a 21st Century Parkway, a consciously and conscientiously evolved type of place within Kansas City's historic Parks and Boulevard system. A ten-step sequence of improvements was identified:

- **Put the “Park” in Parkway**
- **Be a steward of Natural and Cultural Resources**
- **Put People First**
- **Create a North and a South Entry**
- **Reinforce and Reestablish Connections**
- **Infill London Plane Allee and Other Obvious Things**
- **Plant Succession Canopy and Add Plant Diversity**
- **Create Multi-functional Street Sections**
- **Leverage Parks Heritage**
- **Establish a “Friends of West Pennway”**

Within each step a series of specific recommendations was explored.

Eventually the ten steps were concentrated into three:

- **Enrich the Street Section**
- **Make West Pennway a Park**
- **Prepare for the Future**

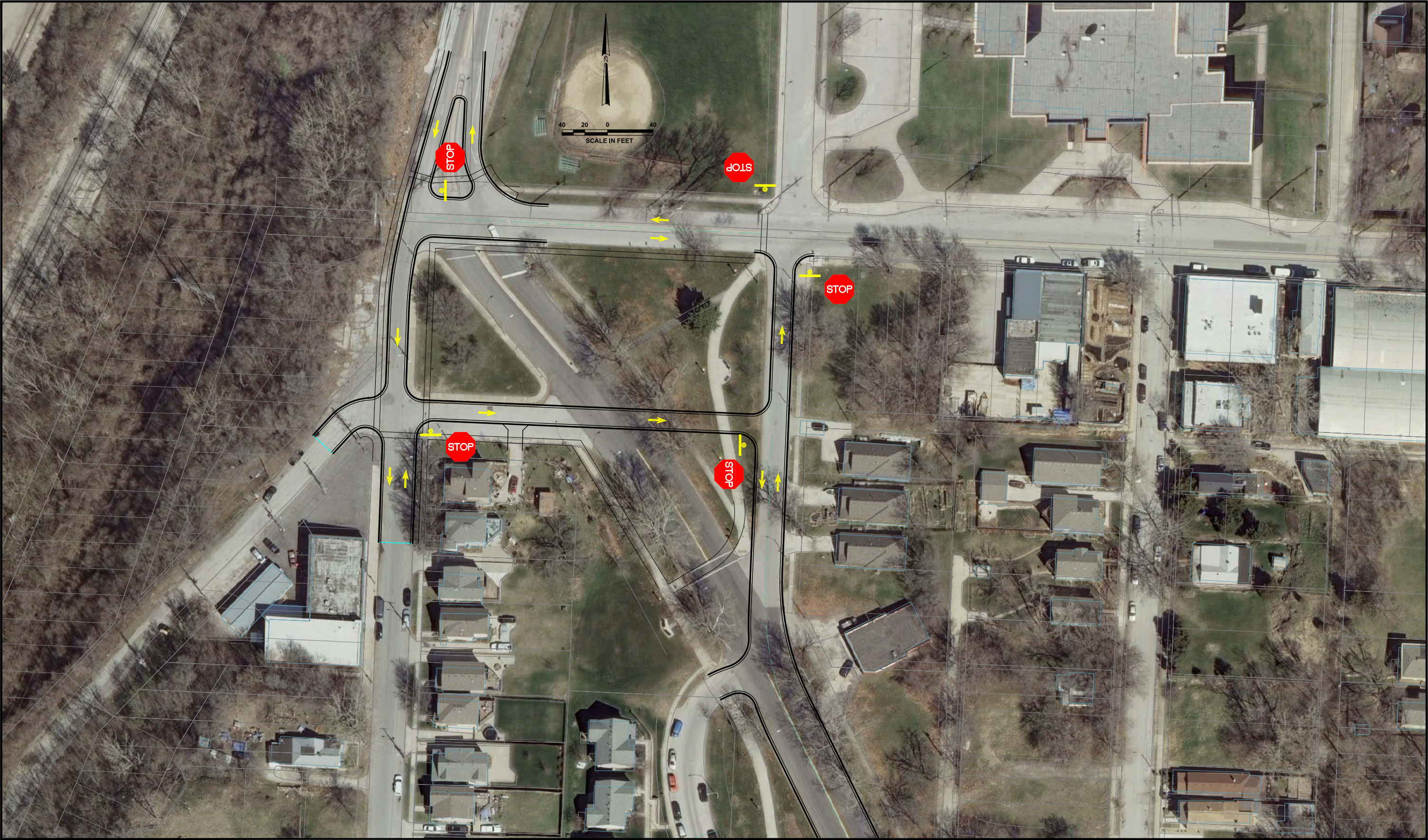
Alternative intersection designs were explored as were roadway and trail sections.





A. West Pennway/Beardsley/17<sup>th</sup> Street - Option 1





B. West Pennway/Beardsley/17<sup>th</sup> Street - Option 2





C. West Pennway/Summit/21<sup>st</sup> Street - Option 1





D. West Pennway/Summit/21<sup>st</sup> Street - Option 2

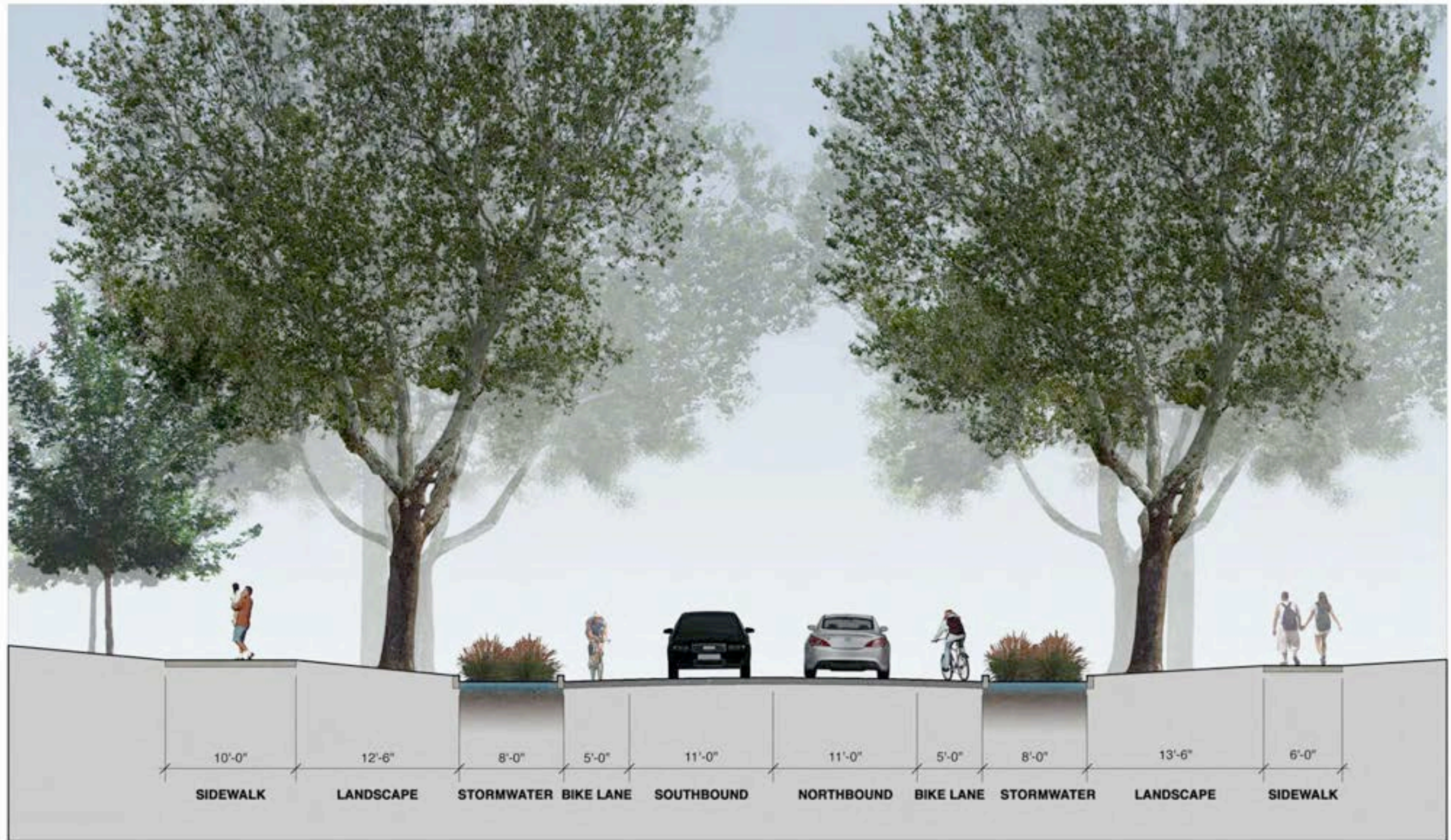




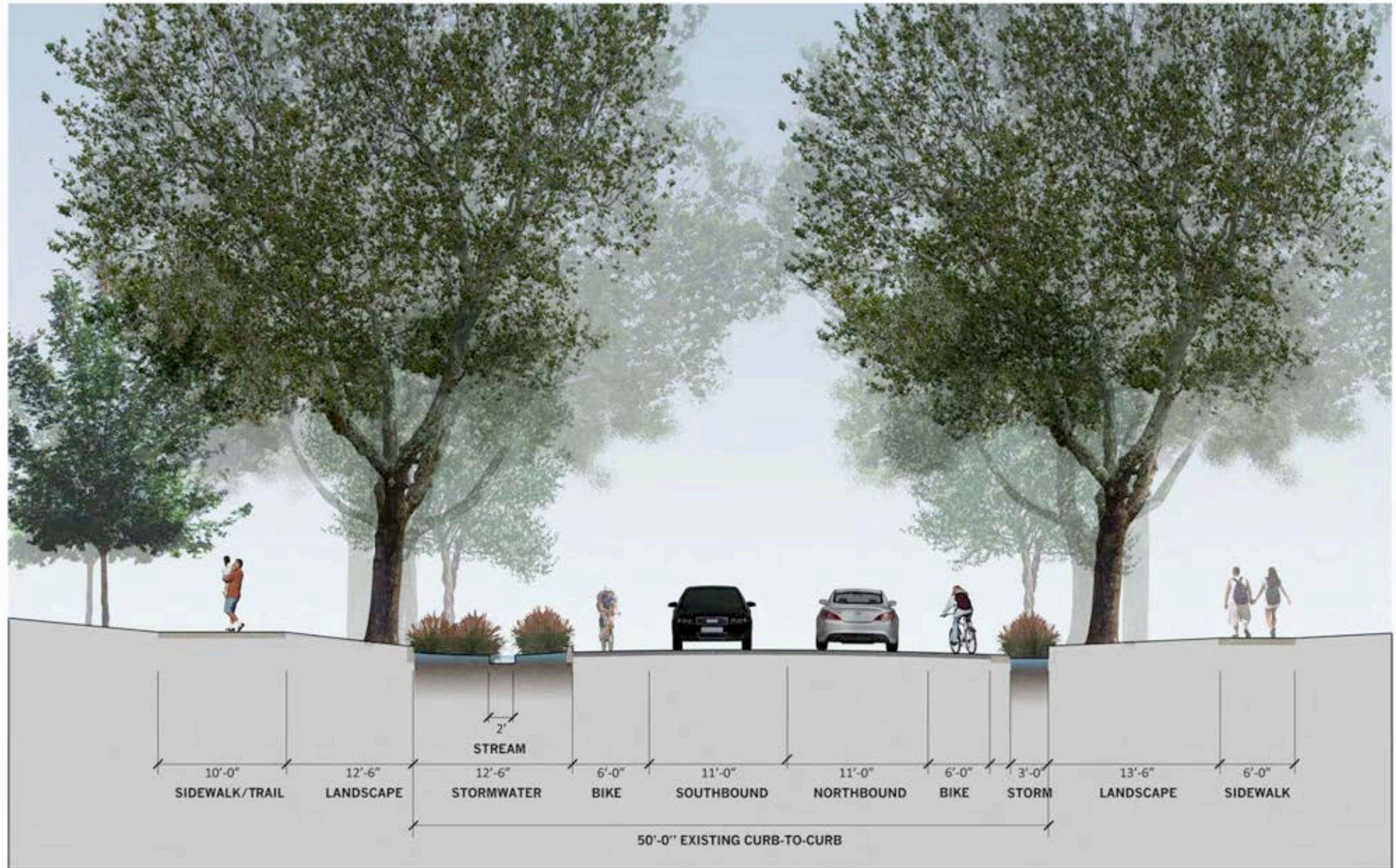
Existing Street Section











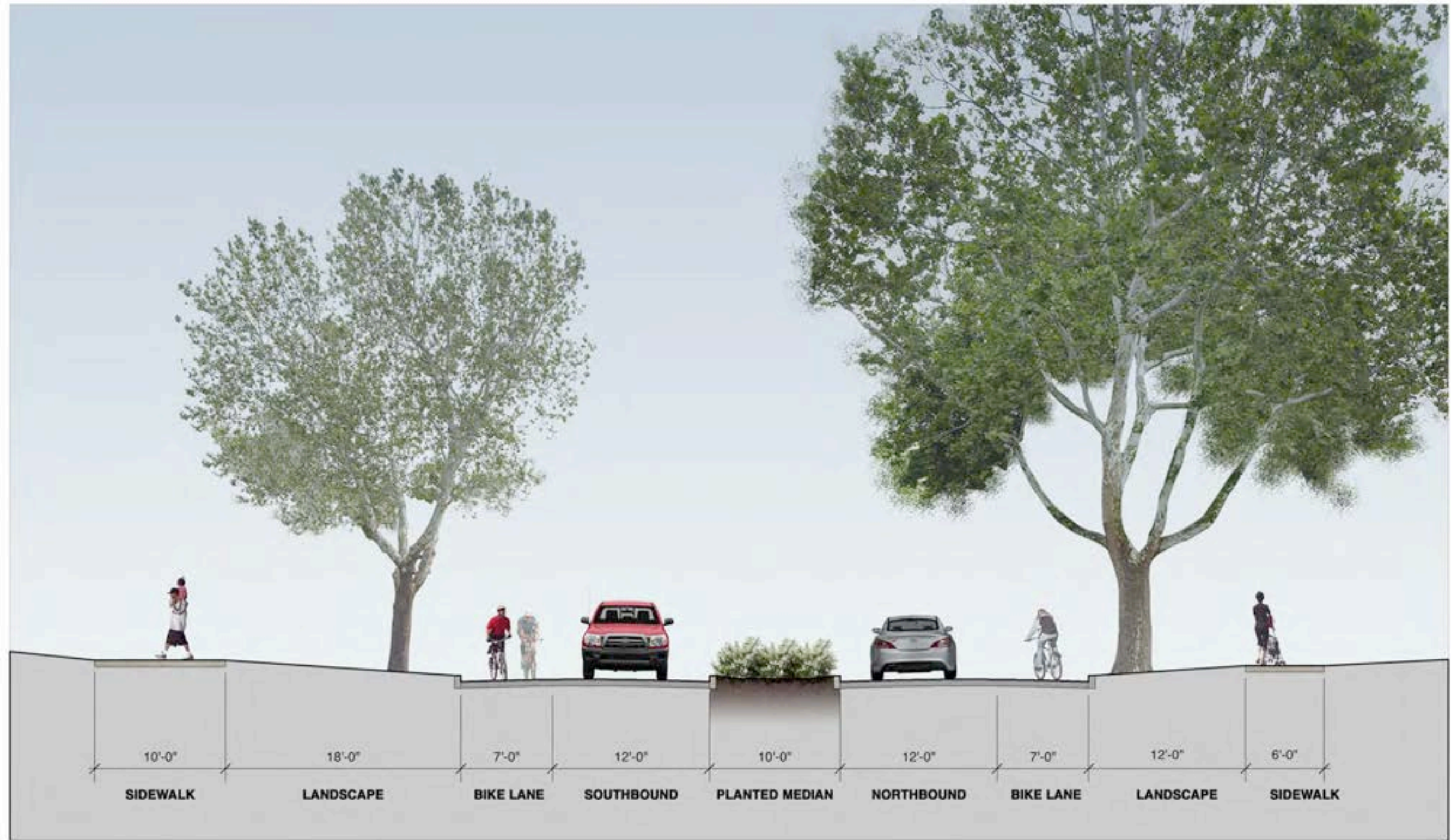
## The 2011 Kessler Meets the Mini-Missouri





Stormwater Park at 18<sup>th</sup> & Belleview





Street Section at West Pennway, south of 17<sup>th</sup> Street





Street Section at West Pennway, north of 21<sup>st</sup> Street





4.1 WEST PENNWAY OVERALL SITE PLAN



## 4. Conceptual Design

### Proposed Streetscape Improvements:

#### 21<sup>st</sup> Street to 20<sup>th</sup> Street

1. Close one-way portion of 21<sup>st</sup> Street. Replace with additional parking for businesses on Summit Street and a pedestrian connection up the hill.
2. Connect Madison Avenue to West Pennway. Reconfigure parking lot of Tony Aguirre Center, moving all parking spaces west of Madison Avenue.
3. Stripe on-street parking across from Irene H. Ruiz Biblioteca and adjacent to Tony Aguirre Center. Connect parking spaces back to sidewalk.
4. Implement stormwater features, including green gutter on the east side of West Pennway in front of Ruiz Library, and vegetated swales at the south end of Madison and the south end of West Pennway.
5. Divide portion of West Pennway just west of Summit Street into two lanes with a planted median. This realigns the roadway with the portion of West Pennway that runs east to west. It also reduces pedestrian crossing distances.
6. Extend allée of London planetrees past Summit Street, to east-west portion of West Pennway.









### Proposed Streetscape Improvements: 20<sup>th</sup> Street to 18<sup>th</sup> Street

1. Restripe West Pennway to two 11' traffic lanes and two 5' bike lanes.
2. Regrade southern end of Westside Community Garden to create public plaza. Area to include community garden plots, hillside seating, orchard, and retaining wall for vertical gardening. See page \_ for detailed plan.
3. Serpentine benches cut into hill provide resting place along riverfront trail.
4. Connect West Pennway and Villa del Sol to Observation Park with tree-lined pedestrian stair.
5. Close leg of Belleview Avenue between West Pennway and 18<sup>th</sup> Street and adapt triangle lot into a stormwater park.
6. Restripe crosswalks at 18<sup>th</sup> Street and West Pennway. Extend sidewalk to connect to Riverfront Heritage Trail.
7. Add parking for Greenwood Baptist Church in lot to the west, as well as on north end of stormwater park.
8. Green gutter on east side of West Pennway
9. Street parking on west side of West Pennway.
10. Replace sidewalk and plant trees on both sides of 18<sup>th</sup> Street between Belleview and Madison. Connect West Pennway to historic stair at intersection of 18<sup>th</sup> Street and Madison.









### **Proposed Streetscape Improvements: 18<sup>th</sup> Street to 17<sup>th</sup> Street**

1. Restripe West Pennway to two 11' traffic lanes and two 5' bike lanes.
2. Narrow south end of Jarboe Street for shorter pedestrian crossing distance.
3. Separate northbound and southbound lanes at north end of West Pennway with planted median.
4. Align Holly Street with 17th Street at intersection of Beardsley and West Pennway.
5. Narrow Beardsley Road at 17th intersection. Align with West Pennway.
6. Close leg of Allen Avenue between Holly Street and West Pennway and reclaim as park space.
7. Extend London Planetree Allée north onto Beardsley.
8. Add parking for commercial building on west side of West Pennway.
9. Remove baseball diamond and turn Jarboe Park into a flexible open space for outdoor recreation or community events.
10. Establish Kersey Coates wildflower/picnic area west of Beardsley, with connection up the bluff to Jarboe Park and Jarboe Pool.
11. Clear brush and trees and create an overlook point and outdoor classroom just west of 17th Street intersection.









conceptual design

LARGE STREET TREES



LONDON PLANETREE

SMALL STREET TREES



PACIFIC SUNSET MAPLE

TREES TO PLANT IN BMPs



SINGLE-TRUNK HERITAGE RIVER BIRCH

SCREENING SHRUBS TO PLANT IN POCKET PARKS



GOLDEN VICARY PRIVET



NORTHERN BAYBERRY



AUTUMN JAZZ ARROWWOOD VIBURNUM



CAREFREE SPIRIT SHRUB ROSE



PLANT SPECIES FOR BMPs



SOUTHERN BLUE FLAG IRIS



SHENANDOAH SWITCHGRASS



SOFT RUSH



TUSSOCK SEDGE



PALM SEDGE



LITTLE HENRY VIRGINIA SWEETSPIRE

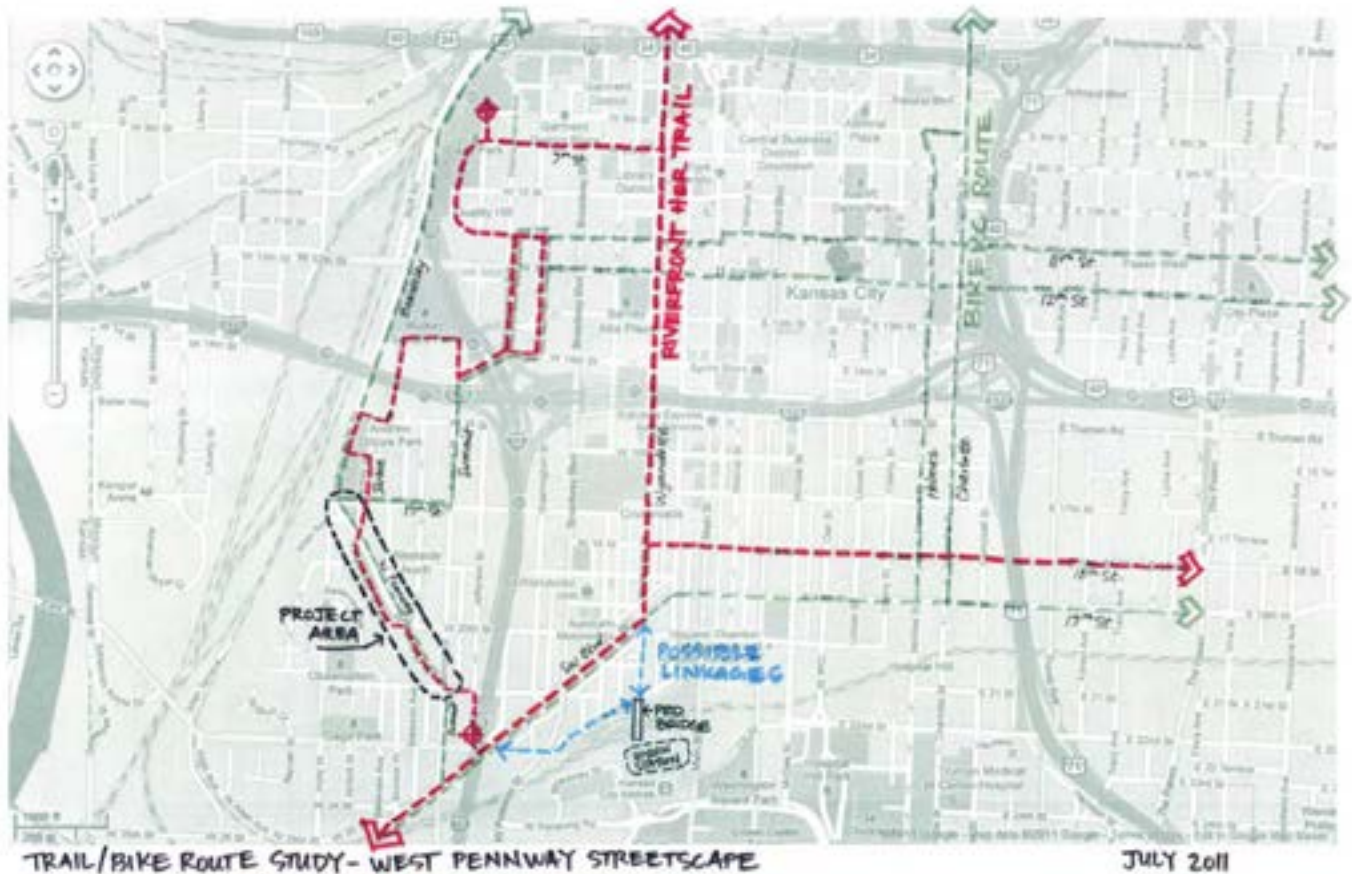


## conceptual design

### Conceptual Park/Trail Alignment

We approached park and trail alignment with three goals:

1. Connect to existing and future possible trails.
2. Prepare for connection with 17th and 20th Street improvements.
3. Provide pedestrian connections to Park features – historical stairs and walls.



18TH & MADISON STAIR



OBSERVATION PARK



OBSERVATION PARK





To: David Dowell, AIA

From: Shashi Gannavaram, P.E, PTP, AICP, PTOE

CC:

Date: 9/2/2011

Re: Technical Memorandum for West Pennway Boulevard Traffic Analysis

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## INTRODUCTION

R^3C Design Group has been selected to complete a traffic operations analysis for two key intersections on West Pennway Boulevard, at 17<sup>th</sup> Street and 21<sup>st</sup> Street, by the Kansas City Parks and Recreation Department. The goal of the project is to make West Pennway pedestrian friendly, while also balancing the historical nature of the Kessler designed Boulevard with traffic flow needs through the corridor. Figure 1 shows the location of the corridor.

This memo outlines the analysis methods used to determine current operational standards in order to establish a baseline. Further, through a public outreach program, the design team lead by el dorado, inc., developed two options at each of the intersections. This memo outlines the completed testing for each of the options.

## EXISTING CONDITIONS REVIEW

Through the existing conditions analysis, we evaluate the current operations of intersections and determine deficiencies that need to be addressed for improvement.



Figure 1: Study corridor location



## 17<sup>TH</sup> STREET INTERSECTION



**Figure 2: Aerial view of West Pennway and 17th Street**

The 17<sup>th</sup> Street intersection at West Pennway Boulevard is a non-standard four-way intersection. West Pennway approaches the intersection from the south at a skew, while 17<sup>th</sup> Street to the east and Beardsley Road to the north are perpendicular to each other. On the west side, Holly Street heads south in-line with Beardsley Road.

### TRAFFIC COUNTS

The intersection is an all-way-stop controlled intersection. Traffic volumes during the peak hours were collected in the spring of 2011 and are shown in Figure 3.



Figure 3: Traffic counts at the 17th Street intersection

Source: TJ Brown & Associates



This intersection provides access to a commercial corridor to the east, and two schools located north of 17<sup>th</sup> Street and west of Holly Street. Despite the land-uses that are accessing the intersection, the volume of traffic is significantly lower than expected because each of the land-uses peak at different times during the day. For example, the school traffic typically peaks before commuter traffic, and the commercial traffic peaks after the commuter traffic. Further, the commercial traffic is primarily local traffic and is not destination based.

The predominant traffic flow is from West Pennway to Beardsley Road, heading north towards downtown Kansas City, Missouri. This traffic flow is however only observed during the afternoon peak hour. Under normal circumstances we would expect this flow to reverse during the morning peak hour. The lack of a morning peak reversal in traffic flow leads us to believe that the afternoon peak traffic is more cut-through in nature, and a result of motorists trying to avoid the congested freeways located just east of the West Pennway corridor.

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## CAPACITY ANALYSIS

Using the traffic counts, we evaluate and rank intersection operations based on the methods prescribed in the Highway Capacity Manual (HCM), published by the Transportation Research Board (TRB) in association with the Federal Highway Administration (FHWA), 2010. The HCM uses the average delays experienced by the user during the analysis period resulting in a letter grade from A through F. This letter grade is known as the Level-of-Service (LOS). LOS A represents minimal average delays to the user, while LOS F represents a complete break-down in the system and users experience severe congestion.

HCM results vary slightly between two-way stop controlled intersections and all-way stop controlled intersections. A two-way stop controlled intersection is one where only the minor street traffic is stopped, or major street turning movements yield to opposing major street through traffic. An all-way stop controlled intersection is one where all the traffic approaching the intersection has to stop prior to entering the intersection.

At a two-way stop intersection, since only minor street movements stop or major street movements yield, they are the only ones that experience

delays. Therefore, LOS is computed only for those movements and an intersection wide delay or LOS is not computed.

At an all-way stop control intersection, all movements stop and experience delays. Therefore, along with individual movement delays and LOS, intersection wide delay and LOS is computed.

The analysis at the 17<sup>th</sup> Street (and later the 21<sup>st</sup> Street) intersection are completed using the Highway Capacity Software (HCS), released by the University of Florida, version 5.6. HCS is the industry leading software for analysis of intersections using HCM methodology.

The results of the existing operational analysis at 17<sup>th</sup> Street are shown in Figure 4. All movements and the all-way stop controlled intersection operate at a LOS A and drivers expect less than 10-second delays at this intersection during both the morning and afternoon peak periods.

Peak Hour	Item	Eastbound Holly Street			Westbound 17 <sup>th</sup> Street			Northbound W. Pennway			Southbound Beardsley Rd.			Intersection
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Morning	Delay (secs)				7.92			7.62			8.17		6.93	7.80
	LOS				A			A			A		A	A
Afternoon	Delay (secs)				7.74			8.18			8.27		6.88	8.01
	LOS				A			A			A		A	A

**Figure 4: Existing capacity analysis results at 17th Street intersection**



## 21<sup>ST</sup> STREET INTERSECTION



The 21<sup>st</sup> Street intersection at West Pennway Boulevard is also a non-standard intersection. The difference from the 17<sup>th</sup> Street intersection is that the 21<sup>st</sup> Street intersection has five-legs. West Pennway approaches the intersection from the north at a skew, while Summit Street, 21<sup>st</sup> Street, and West Pennway from the east all approach on a perpendicular grid.

Five-leg intersections are always a challenge for traffic engineers because the size of the intersection becomes fairly large and provides challenges in relation to visibility across the intersection. Pedestrian walking distances become large and sometimes at an angle to the traffic stream, making pedestrians feel vulnerable. Further complicating matters at



this intersection is the high approach grade on 21<sup>st</sup> Street from the west.

In the past, when traffic volumes justified it, this intersection was controlled by a signal on all approaches. However, over the years traffic volumes declined and therefore, the City of Kansas City, Missouri removed the signal at this location and converted it to an all-way stop controlled intersection. This results in drivers

having to view four other approaches before entering the intersection, which leads to significant confusion and near-miss-crashes.



**Looking east down 21<sup>st</sup> Street**

21<sup>st</sup> Street west of the intersection is a one-way street headed westbound (away from the intersection). Because of an accident in the 1970s involving a school bus that could not stop on the steep approach grade during wintery conditions, the city made this street a one-way street headed uphill. However, the street was not necked down for one-way operations, providing a false impression that two-way traffic is permissible.

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### TRAFFIC COUNTS

Intersection traffic counts were collected in spring 2011 during the morning and afternoon peak periods. These counts are shown in Figure 5.





**Figure 5: Traffic counts at 21st Street and West Pennway**

There is a high volume of traffic that uses Summit Street going north-south in the morning and afternoon peak periods. Significantly higher traffic volumes use Summit Street to go north on West Pennway.

South of the intersection, Summit Street is well used to access Interstate 35 (I-35), just east of this intersection. However, the traffic volume performing this movement during the peak periods is not high.

### CAPACITY ANALYSIS

As with the 17<sup>th</sup> Street intersection, we completed a capacity and operational analysis of this intersection to document current operational levels. Being a five legged intersection, standard methods of analysis do not apply. The

Highway Capacity Manual (HCM) can't analyze five leg intersections. Therefore, a modified version of the intersection was analyzed by removing the 21<sup>st</sup> Street leg west of the intersection. The result of this analysis using the Highway Capacity Software (HCS) is shown in Figure 6.

Peak Hour	Item	Eastbound W. Pennway			Westbound W. Pennway			Northbound Summit St.			Southbound Summit St.			Intersection
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Morning	Delay (secs)	9.06			9.25	8.27		9.20	8.90		10.18			9.39
	LOS	A			A	A		A	A		B			A
Afternoon	Delay (secs)	9.36			9.42	9.27		10.2	9.24		10.57			9.83
	LOS	A			A	A		B	A		B			A

**Figure 6: Existing capacity analysis results at 21<sup>st</sup> Street intersection.**

The results of the analysis indicate that there are no major delays being experienced by drivers using the intersection. This was corroborated by numerous field visits completed by the design team. Southbound Summit Street traffic experiences minutely longer delays, greater than 10 seconds, and therefore operates at a LOS B. However, intersection wide operations during the two peak hours are at a LOS A.



## ADDITIONAL STUDIES

## 24-HOUR COUNTS

As part of the West Pennway study, we also collected 24-hour counts at various locations around the corridor. The locations and the 24-hour counts are shown in Figure 7.

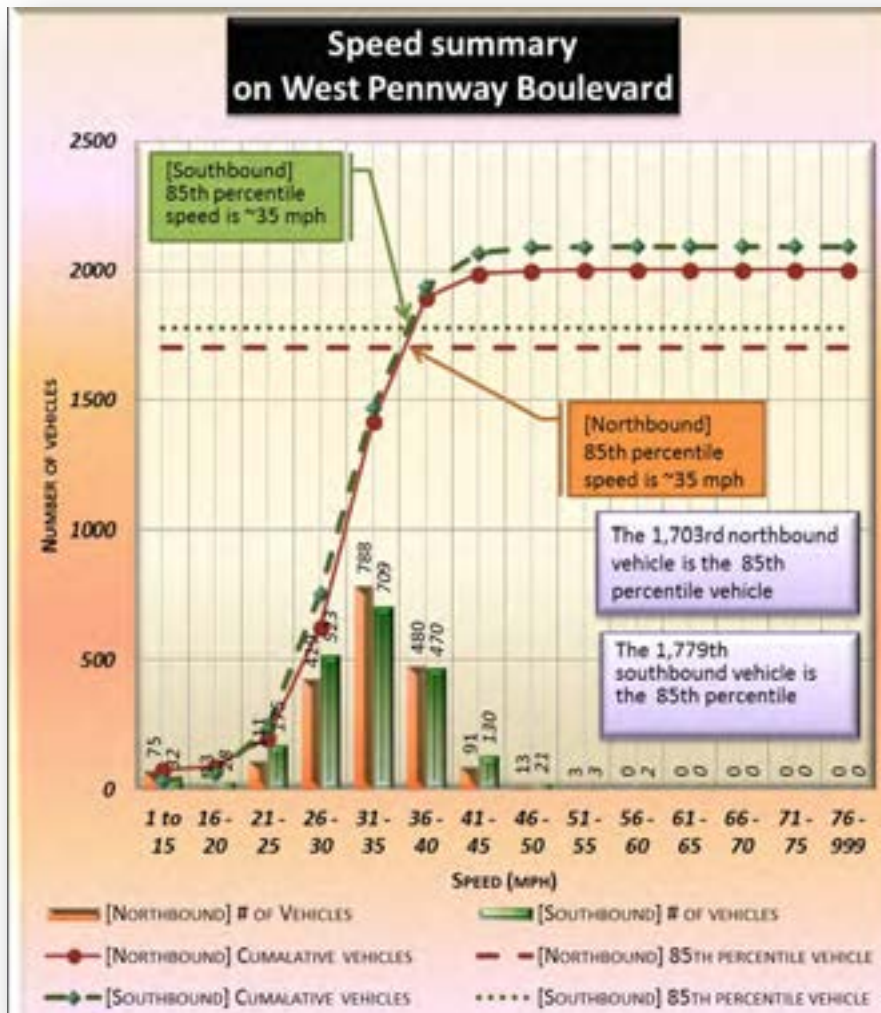


**Figure 7: 24-hour traffic counts around West Pennway Boulevard**

Source: TJ Brown and Associates

## SPEED STUDY

In addition to collecting 24-hour counts, one location was selected to obtain traveling speed information to help evaluate any speeding occurring on West Pennway Boulevard. The location selected was on West Pennway Boulevard, north of the Tony Aguirre Center. The results of the speed study are shown in Figure 8.



**Figure 8: Speed study summary on West Pennway Boulevard, north of Tony Aguirre center.**

The speed analysis suggests that there is minimal speeding occurring on West Pennway Boulevard. The 85<sup>th</sup> percentile speed is a little over 35 mph. The 85th percentile is the speed at which 85% of the observed vehicles are traveling at or below. This percentile is typically used in



evaluating/recommending posted speed limits based on the assumption that 85% of the drivers are traveling at a speed they perceive to be safe.

However, we should note that 107 of the 1,703 (approximately 6.5%) northbound vehicles were traveling at speeds greater than 40 mph. Similarly, 156 of the 2,093 (approximately 7.5%) southbound vehicles are traveling at speeds greater than 40 mph.

## DEVELOPING FUTURE ALTERNATIVES

As we have observed during the existing conditions analysis, the traffic volumes are comparatively lower than similar intersections in the Kansas City Metro area. However, both the 17<sup>th</sup> Street and the 21<sup>st</sup> Street intersections are awkward, non-standard intersections which could confuse the driver, and are not conducive to developing the walking/biking environment that the Parks and Recreation Department, the stakeholders and community leaders desire. Because of the opportunities that present themselves due to the lower-than-usual traffic volumes, a series of geometric improvements at the intersections were presented to the stakeholders. A brief discussion of each is presented here.

### 17<sup>TH</sup> STREET INTERSECTION

The following options were considered for this intersection:

- Making the intersection a standard four-way intersection;
- Roundabout;
- A 'square-about' – where a traditional roundabout is stretched along existing streets to form a rectangular or square shape.

### STANDARD FOUR-WAY INTERSECTION

In this option, West Pennway Boulevard follows its current alignment. Holly Street, Beardsley Road and 17<sup>th</sup> Street are curved to form a standard four-way intersection. Intersection control here can be a less restrictive two-way stop control intersection, or a more-restrictive all-way stop control intersection.



### ROUNDAABOUT

The roundabout option realigns the roadways as discussed in the standard four-way intersection. However, intersection control would be achieved using a roundabout. Roundabouts are more pedestrian friendly options, and assist in slowing down traffic using the intersection. However, they are not as friendly to larger vehicles as school buses, and emergency vehicles.

With two schools accessing this intersection, a large number of buses would continue to be expected. A roundabout could pose a challenge for these buses.



Further, for a roundabout to operate at optimal operational levels, the volumes of traffic from all four approaches of the roundabout should be near equal. This distribution is not available at this



location. During stakeholder meetings, minimal interest was shown towards building a roundabout at this intersection, and therefore, we are not pursuing analysis for this option.

### SQAURE-ABOUT

The square-about is a modified roundabout where the existing roadway network is used to develop an island in West Pennway that could serve as an entry feature to the boulevard. The island could service any use from retail to civic. The first version of the square-about was a one-way rectangle. However, during stakeholder and design team meetings, it was decided that it was best to retain truck traffic going east on 17<sup>th</sup> Street instead of rerouting truck traffic to residential frontages. Therefore, the one-way square about was changed by making 17<sup>th</sup> Street a two-way street. Further, this would assist with the school bus traffic at the intersection.



Because of stakeholder and public reactions, only the standard four-way intersection and the square-about options are being further considered for analysis.

### 21<sup>ST</sup> STREET INTERSECTION

The following options were recognized and presented for this intersection:

- Roundabout,
- Improving the existing intersection and
- Eliminating the 21<sup>st</sup> Street leg.

## ROUNDAABOUT

Constructing a roundabout at this intersection was the recommendation of the 22<sup>nd</sup>/23<sup>rd</sup> Street Study completed by the City of Kansas City, Missouri. As the design team started designing this roundabout, we realized that due to the five legs, and skewed entrance of West Pennway, the resulting roundabout would need to be large in order to achieve optimal efficiency of operations. Having a very large roundabout would not only ruin the character of the street, it could also be very cumbersome to use for pedestrians and non-motorists, such as bicyclists. Stakeholder and public reaction to the roundabout was very negative and this option was dropped early during the design process.



## IMPROVING THE EXISTING INTERSECTION



During field visits and preliminary design, the design team realized that there are many things that could be altered in the existing intersection to reduce the footprint, and therefore make it more pedestrian friendly. These included narrowing 21<sup>st</sup> Street west of the intersection to a one-way westbound street, smoothing out the curve on West Pennway through the intersection, and reducing the width of West Pennway north of the intersection.



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## ELIMINATING THE 21<sup>ST</sup> STREET LEG

Typically when traffic engineers encounter a five-leg intersection, the chosen alternative is to relocate one of the legs away from the intersection and create a 'T' – intersection. The remaining four legs would then form a standard four-way intersection.

This philosophy was applied to the existing intersection by removing the exit at 21<sup>st</sup> Street.

However, because of terrain constraints, 21<sup>st</sup>

Street could not be relocated to intersect West Pennway within a reasonable budget. Instead, the design team developed a solution that brought 21<sup>st</sup> Street to a 'T'-intersection with Madison Street and carried Madison Street through the Tony Aguirre Center parking lot to create a 'T'-intersection on West Pennway. This option increases the number of available movements because Madison Street and 21<sup>st</sup> Street west of Madison Street will be two-way streets. Currently, 21<sup>st</sup> Street is a one-way street headed westbound.

Further, the realignment of Madison Street provides an opportunity to enhance the Tony Aguirre's community center's parking infrastructure by improving the circulation within the lot.

Because of stakeholder and public reactions, only improving existing intersection and eliminating the 21<sup>st</sup> Street leg options were considered further for analysis.



## FUTURE YEAR TRAFFIC OPERATIONS ANALYSIS

As discussed in the prior section, two options for each intersection were carried forward for further analysis. Analysis was completed using the Highway Capacity Software (HCS) based on the methods prescribed in the Highway Capacity Manual (HCM).

## TRAFFIC VOLUMES

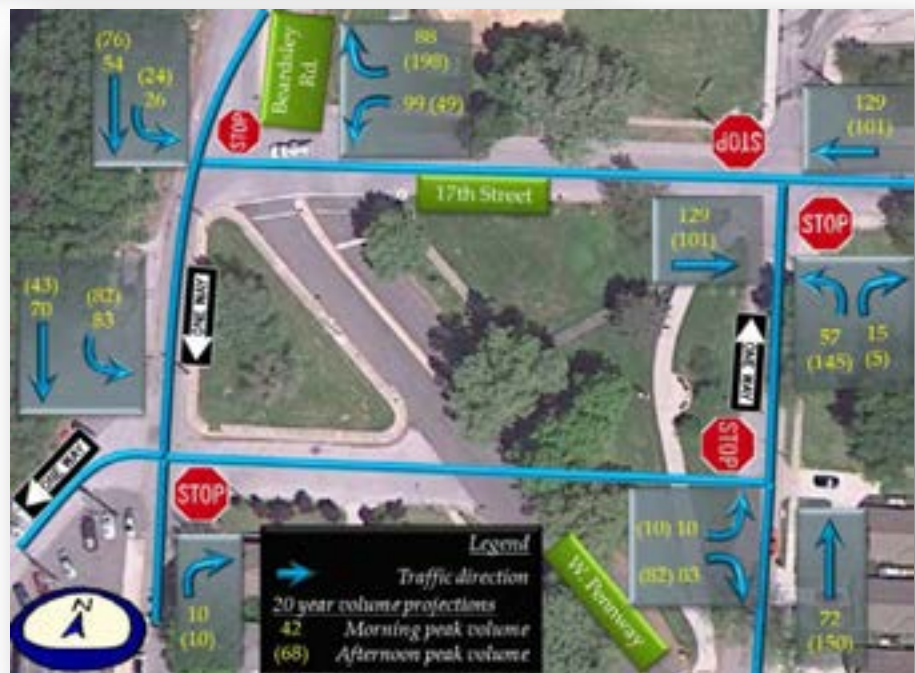
Because any improvement should last well into the future, we tested the four options for operations during the year 2031. We assume that the traffic demand on the corridor will increase at a one-percent (1%) growth rate over the next 20-years. This increases traffic by approximately 22% over the next 20-years. The 1% growth rate was determined appropriate for this analysis because these intersections and the West Pennway corridor lie in a well-established and developed area of the Kansas City Metro area.

Using the 1% growth rate, current traffic counts shown in Figures 3 and 5 are reallocated and expanded for each of the options at each of the intersections being considered. These future reallocated volumes are summarized in Figures 9 and 10.





Figure 9: 2031 traffic volumes for the 17th Street intersection options



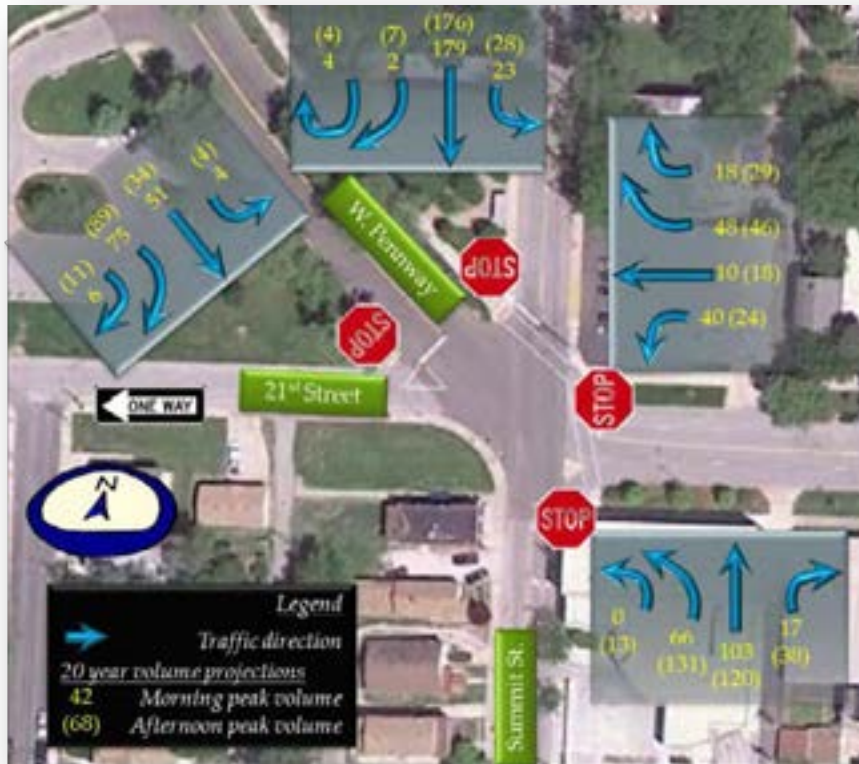
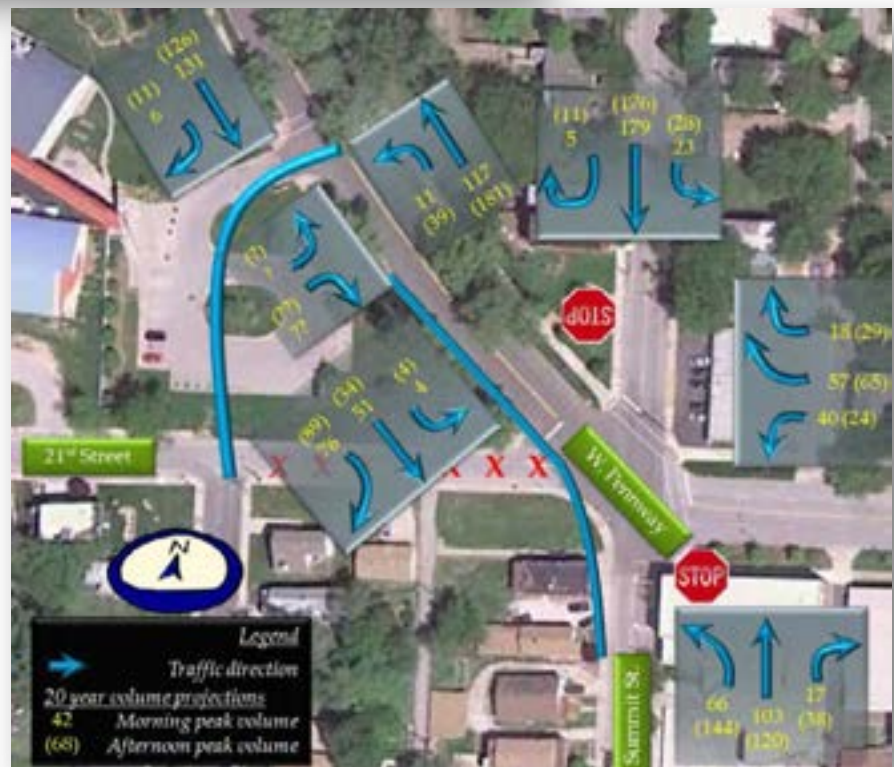


Figure 10: 2031 traffic volumes for the 21st Street intersection options





## CAPACITY ANALYSIS

Using the traffic volumes shown in Figures 9 and 10, capacity and operational analysis was completed for the two options at each intersection. Because West Pennway is the primary through street, we first test the system for a less-restrictive two-way stop condition at both intersections.

Therefore, for the 17<sup>th</sup> Street standard four-way intersection, only traffic on 17<sup>th</sup> Street / Holly Avenue is stopped. Similarly, for the eliminate 21<sup>st</sup> Street leg option at the 21<sup>st</sup> Street intersection, Summit Street traffic is stopped while the West Pennway traffic is allowed to flow freely.

The results of the analysis at each of the intersections are presented in Figure 11 for the 17<sup>th</sup> Street intersection and Figure 12 for the 21<sup>st</sup> Street intersection options.

Peak Hour	Item	Eastbound			Westbound			Northbound			Southbound			Intersection
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
17 <sup>th</sup> Street Option 1: Standard intersection operating with 2-way stop control														
Morning	Delay (secs)					10.5			7.3			7.4		
	LOS					B			A			A		
Afternoon	Delay (secs)					10.7			7.4			7.6		
	LOS					B			A			A		
17 <sup>th</sup> Street Option 2: Square-about														
Intersection: West Pennway East leg at 17 <sup>th</sup> Terrace														
Morning	Delay (secs)	9.60												
	LOS	A												
Afternoon	Delay (secs)	10.0												
	LOS	A												

Figure 11: 2031 capacity analysis results for 17th Street options



Peak Hour	Item	Eastbound			Westbound			Northbound			Southbound			Intersection
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
17 <sup>th</sup> Street Option 2: Square-about (continued)														
Intersection: West Pennway East leg at 17 <sup>th</sup> Street														
Morning	Delay (secs)	7.60						10.3						
	LOS	A						B						
Afternoon	Delay (secs)	7.60						11.1						
	LOS	A						B						
Intersection: West Pennway West leg at 17 <sup>th</sup> Street														
Morning	Delay (secs)	10.1		9.0							7.3			
	LOS	B		A							A			
Afternoon	Delay (secs)	9.90		9.8							7.3			
	LOS	A		A							A			

Figure 11: 2031 capacity analysis results for 17th Street options (continued)

Peak Hour	Item	Eastbound			Westbound			Northbound			Southbound			Intersection	
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right		
17 <sup>th</sup> Street Option 2: Square-about (continued)															
Intersection: West Pennway West leg at 17 <sup>th</sup> Terrace															
Morning	Delay (secs)								7.40			7.60			
	LOS								A			A			
Afternoon	Delay (secs)								7.30			7.60			
	LOS								A			A			

**Figure 11: 2031 capacity analysis results for 17th Street options (continued)**

From this future analysis we observe that all movements are operating at a very reasonable LOS and drivers would be experiencing minimal delays at the intersection.

For the standard four-way intersection option, converting the intersection to a two-way stop does not hinder the operational efficiency of the intersection. However, a two-way stop may be perceived as being less pedestrian friendly because pedestrians have to wait for appropriate gaps in the vehicle streams before crossing West Pennway. Even if the intersection is converted to an all-way stop, we believe that the operational efficiency will not suffer because of the low volumes during peak hours.

The square-about option performs well in the future because the traffic is fairly well distributed along a grid. This option would be perceived as being pedestrian friendly because of the smaller road width that has to be crossed and the availability of stop signs at almost intersections. However, some of the traffic will have to travel longer distances to get to their destinations.



This increase in travel distance could assist in reducing cut-through traffic volumes.

Peak Hour	Item	Eastbound			Westbound			Northbound			Southbound			Intersection
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
21 <sup>st</sup> Street Option 1: Improve the existing intersection (4-way stop)														
Morning	Delay (secs)	9.89			9.74	9.36		9.70	9.61		11.5			
	LOS	A			A	A		A	A		B			
Afternoon	Delay (secs)	10.3			9.93	10.1		11.2	10.2		12.2			
	LOS	B			A	B		B	B		B			
21 <sup>st</sup> Street Option 2: Eliminate the 21 <sup>st</sup> Street leg (2-way stop)														
Morning	Delay (secs)	7.60						10.3						
	LOS	A						B						
Afternoon	Delay (secs)	7.60						11.1						
	LOS	A						B						

**Figure 12: 2031 capacity analysis results for 21st Street options**

The future year analysis at the 21<sup>st</sup> Street intersection also suggests that the intersection would operate at high efficiency for both the options considered.

Option 1 – cleaning up the existing five-legged intersection does not hinder traffic flow. However, the existing driver confusion in navigating a five-way intersection remains. Converting the intersection to a two-way stop with five-legs could reduce vehicular safety because of its complexity. Further, because of its large footprint and angled crossings, the five-leg option may continue to be perceived as being unfriendly and cumbersome to pedestrians.

The second option of eliminating the 21<sup>st</sup> Street leg to the west and creating two 'T' intersections, one at Madison Street and at West Pennway, provides a standardized solution in tough terrain conditions. The intersection footprint reduces considerably, creating a favorable walking environment. We also believe that traffic circulation into and out of the Tony Aguirre Community Center improves with this option.

### SUGGESTIONS FOR IMPROVEMENTS

R^3C Design Group as part of a design team lead by el dorado, inc., was charged with analyzing intersection operations at the 17<sup>th</sup> Street and 21<sup>st</sup> Street intersection on West Pennway Boulevard for the Kansas City, Missouri, Parks and Recreation Department. The Parks Department desires to improve the roadway for:

- Improved traffic flow in the corridor bounded by 17<sup>th</sup> Street to the north, and 21<sup>st</sup> Street to the south;
- Improve the pedestrian experience on the George Kessler designed Boulevard and convert it to a 21<sup>st</sup> century parkway.

Existing traffic counts and speed data were analyzed to show that no major congestion issues or speeding issues were prevalent in the corridor. Because both the 17<sup>th</sup> Street and 21<sup>st</sup> Street intersections are skewed, non-standard and awkward intersections, driver confusion and pedestrian unfriendliness abound.

Because challenges at the intersection were not operational, many suggestions with few constraints presented themselves. One of the primary constraints at the 21<sup>st</sup> Street intersection was the rough terrain west of the intersection. Numerous options were presented to the stakeholders and



citizens of the corridor and two options were selected for each intersection. Based on stakeholder reactions, the options are as follows:

- 17<sup>th</sup> Street:
  - Standard four-way intersection with three of the four legs to the intersection realigned to create a four-way intersection, and;
  - A square-about created by modifying existing streets south of 17<sup>th</sup> Street to one-way operations while maintaining 17<sup>th</sup> Street as two-way in order to accommodate truck traffic.
- 21<sup>st</sup> Street:
  - Clean-up the existing intersection by narrowing down West Pennway and the 21<sup>st</sup> Street one-way exit from the intersection to standard widths for operation, and;
  - Eliminate the 21<sup>st</sup> Street leg by creating a 'T' intersection with Madison Street and then continuing Madison Street through to West Pennway to create another T-intersection. This improves traffic circulation to the neighborhood because both Madison Street and 21<sup>st</sup> Street will be converted to two-way operations.

The four options were analyzed for projected traffic volumes generated by increasing the existing traffic counts by one-percent (1%) per year for 20 years. The 2031 analysis did not indicate any developing operational constraints, and all four options are projected to perform reasonably well with drivers experiencing minimal delays.

Because all options being considered are operationally efficient, the final selection for each intersection should be based on stakeholder, citizen and Parks Department preferences. Because all concerned groups prefer a walk-able environment, consideration should be given to the following selections:

- ✓ 17<sup>th</sup> Street – standard 4-way intersection
- ✓ 21<sup>st</sup> Street – eliminate the 21<sup>st</sup> Street leg at the intersection.

## 5. Implementation

### 5.1 Recommended Phasing

Phase 1	Stakeholder Consensus Building Site Analysis Concept Design Preliminary Cost Estimates
Phase 2	Technical Design: Parts A, B and C
Phase 3	Bidding and Construction: Parts A, B and/or C
Phase 4	Technical Design: Parts D, C and E
Phase 5	Bidding and Construction: Parts D, C and/or E





**Construction Estimate**

**A - 17th Street & West Pennway Intersection**  
Intersection & Lookout

DIVISIONS	Remarks	UNIT	QUANTITY	UNIT \$	TOTAL
<b>01 - GENERAL CONDITIONS</b>					<b>\$57,500.00</b>
Mobilization - Setup		LS	1	\$25,000.00	\$25,000.00
Construction Layout		LS	1	\$7,500.00	\$7,500.00
Construction Waste Mgmt.		LS	1	\$5,000.00	\$5,000.00
Temporary Facilities / Utilities / Detouring		LS	1	\$10,000.00	\$10,000.00
Construction Fencing		LF	2,500	\$2.00	\$5,000.00
Erosion Control		LS	1	\$5,000.00	\$5,000.00
<b>02 - EXISTING CONDITIONS</b>					<b>\$108,540.00</b>
Existing Curb & Concrete Removal		LS	1	\$15,000.00	\$15,000.00
Existing Asphalt & Subgrade Removal		SY	3,427	\$20.00	\$68,540.00
Existing Electrical Removal		LS	1	\$5,000.00	\$5,000.00
Existing Tree Removal		LS	1	\$20,000.00	\$20,000.00
<b>31 - EARTHWORK - SITE PREPARATION</b>					<b>\$55,000.00</b>
Site Clearing		LS	1	\$10,000.00	\$10,000.00
Earth Moving		LS	1	\$20,000.00	\$20,000.00
Dewatering		LS	1	\$5,000.00	\$5,000.00
Engineered Sub-Soils		LS	1	\$20,000.00	\$20,000.00
<b>32 - PAVING</b>					<b>\$249,752.00</b>
Asphalt Paving (overlay & 2" cold mil)		SY	2,066	\$12.00	\$24,792.00
Asphalt Paving (8")		SY	1,330	\$65.00	\$86,450.00
Concrete Paving, Driveway & Alley Repair		SY	213	\$75.00	\$15,975.00
Surface Striping		LS	1	\$2,500.00	\$2,500.00
ADA Crossings		LS	13	\$1,500.00	\$19,500.00
Concrete Sidewalk		SY	1,104	\$40.00	\$44,160.00
Concrete Curb & Gutter		LF	2,255	\$25.00	\$56,375.00
<b>32 - PLANTINGS</b>					<b>\$194,492.50</b>
Planting Irrigation		LS	1	\$5,000.00	\$5,000.00
Turf & Grasses		ACRE	1.82	\$2,500.00	\$4,550.00
Trees		EACH	68	\$1,500.00	\$102,000.00
Plantings		EACH	347	\$15.00	\$5,205.00
BMP Plantings		EACH	865	\$22.00	\$19,030.00
Amended BMP Soil		CY	185	\$89.60	\$16,576.00
Topsoil		CY	79,063	\$0.50	\$39,531.50
mulch / rock		CY	26	\$100.00	\$2,600.00
<b>32 - EXTERIOR IMPROVEMENTS</b>					<b>\$640,055.00</b>
Wayfinding Signage		LS	1	\$10,000.00	\$10,000.00
Roadway Signage		LS	1	\$2,000.00	\$2,000.00
Grates / Inlets		EACH	9	\$3,500.00	\$31,500.00
Bollards		EACH	10	\$500.00	\$5,000.00
Stairs @ Outlook		LS	1	\$62,000.00	\$62,000.00
Bike Racks		LS	4	\$750.00	\$3,000.00
Trash Receptacles / Recycling		EACH	6	\$750.00	\$4,500.00
Retaining Wall		SFF	3,171	\$85.00	\$269,535.00
BMP Wall		LF	158	\$140.00	\$22,120.00
Benches		EACH	10	\$1,200.00	\$12,000.00
Boardwalk		LF	57	\$1,200.00	\$68,400.00
Pavillions		EACH	3	\$10,000.00	\$30,000.00
Public Art & Communication		LS	1	\$20,000.00	\$20,000.00
Lookout		LS	1	\$100,000.00	\$100,000.00
<b>33 - UTILITIES</b>					<b>\$214,695.00</b>
Basic Utilities		LS	1	\$5,000.00	\$5,000.00
Storm Utilities / Relocation		LS	1	\$29,695.00	\$29,695.00
Plaza Lighting		LS	1	\$30,000.00	\$30,000.00
General Electrical & Street Lighting		EACH	15	\$10,000.00	\$150,000.00

**TOTAL [COW]**

**\$1,411,494.50**

Contingency  
Testing  
Permit Fees

20.00%  
2.00%  
2.00%

\$282,298.90  
\$28,229.89  
\$28,229.89

**Subtotal Construction**

**\$338,758.68**

**00 - PROFESSIONAL SERVICES**

**\$367,873.63**

Design Fees (Architectural / Engineering / Survey)  
Legal  
Contractor Overhead & Profit  
Build (Construction Management / Supervision)

10.00%  
  
10.00%  
5.00%

\$141,149.45  
\$15,000.00  
\$141,149.45  
\$70,574.73

**TOTAL PROJECT COSTS**

**\$2,118,126.81**





Construction Estimate

B - West Pennway  
Pennway Terrace to Madison Avenue

DIVISIONS	Remarks	UNIT	QUANTITY	UNIT \$	TOTAL
01 - GENERAL CONDITIONS					<b>\$82,000.00</b>
	Mobilization - Setup	LS	1	\$25,000.00	\$25,000.00
	Construction Layout	LS	1	\$10,000.00	\$10,000.00
	Construction Waste Mgmt.	LS	1	\$12,000.00	\$12,000.00
	Temporary Facilities / Utilities / Detouring	LS	1	\$15,000.00	\$15,000.00
	Construction Fencing	LF	5,000	\$2.00	\$10,000.00
	Erosion Control	LS	1	\$10,000.00	\$10,000.00
02 - EXISTING CONDITIONS					<b>\$179,540.00</b>
	Existing Curb & Concrete Removal	LS	1	\$50,000.00	\$50,000.00
	Existing Asphalt & Subgrade Removal	SY	5,727	\$20.00	\$114,540.00
	Existing Electrical Removal	LS	1	\$7,500.00	\$7,500.00
	Existing Tree Removal	LS	1	\$7,500.00	\$7,500.00
31 - EARTHWORK - SITE PREPARATION					<b>\$70,000.00</b>
	Site Clearing	LS	1	\$10,000.00	\$10,000.00
	Earth Moving	LS	1	\$30,000.00	\$30,000.00
	Dewatering	LS	1	\$10,000.00	\$10,000.00
	Engineered Sub-Soils	LS	1	\$20,000.00	\$20,000.00
32 - PAVING					<b>\$443,235.00</b>
	Asphalt Paving (overlay & 2" cold mil)	SY	4,077	\$12.00	\$48,924.00
	Concrete Paving, Driveway & Alley Repair	SY	2,326	\$75.00	\$174,450.00
	Parking	EACH	17	\$3,000.00	\$51,000.00
	Surface Striping	LS	2	\$2,500.00	\$5,000.00
	ADA Crossings	LS	11	\$1,500.00	\$16,500.00
	Concrete Sidewalk	SY	1,223	\$40.00	\$48,920.00
	Concrete Curb & Gutter	LF	273	\$25.00	\$6,825.00
	New Concrete Curb & Gutter / Edge Work	LF	2,863	\$32.00	\$91,616.00
32 - PLANTINGS					<b>\$992,980.00</b>
	Trees	EACH	22	\$1,500.00	\$33,000.00
	Stormwater Park	LS	454	\$85.00	\$38,590.00
	Engineered Planting Soils / BMP/ plantings / mulch / rock	SY	92,139	\$10.00	\$921,390.00
32 - EXTERIOR IMPROVEMENTS					<b>\$214,690.00</b>
	Wayfinding Signage	LS	1	\$10,000.00	\$10,000.00
	Roadway Signage	LS	1	\$5,000.00	\$5,000.00
	Grates / Inlets	EACH	20	\$3,500.00	\$70,000.00
	Bollards	EACH	26	\$500.00	\$13,000.00
	Bike Racks	LS	4	\$750.00	\$3,000.00
	Trash Receptacles / Recycling	EACH	6	\$750.00	\$4,500.00
	Masonry Wall	SFF	250	\$85.00	\$21,250.00
	Serpentine Masonry Wall	LF	451	\$140.00	\$63,140.00
	Benches	Each	4	\$1,200.00	\$4,800.00
	Public Art & Communication / Structures	LS	1	\$20,000.00	\$20,000.00
33 - UTILITIES					<b>\$591,875.00</b>
	Basic Utilities	LS	1	\$5,000.00	\$5,000.00
	Storm Utilities / Relocation	LS	1	\$92,595.00	\$92,595.00
	Subdrainage	LS	1	\$44,280.00	\$44,280.00
	Roadway Lighting	LS	1	\$50,000.00	\$50,000.00
	General Electrical & Lighting	EACH	40	\$10,000.00	\$400,000.00

**TOTAL [COW]**

**\$2,394,780.00**

Contingency

20.00%

\$478,956.00

Testing

2.00%

\$47,895.60

Permit Fees

2.00%

\$47,895.60

**Subtotal Construction**

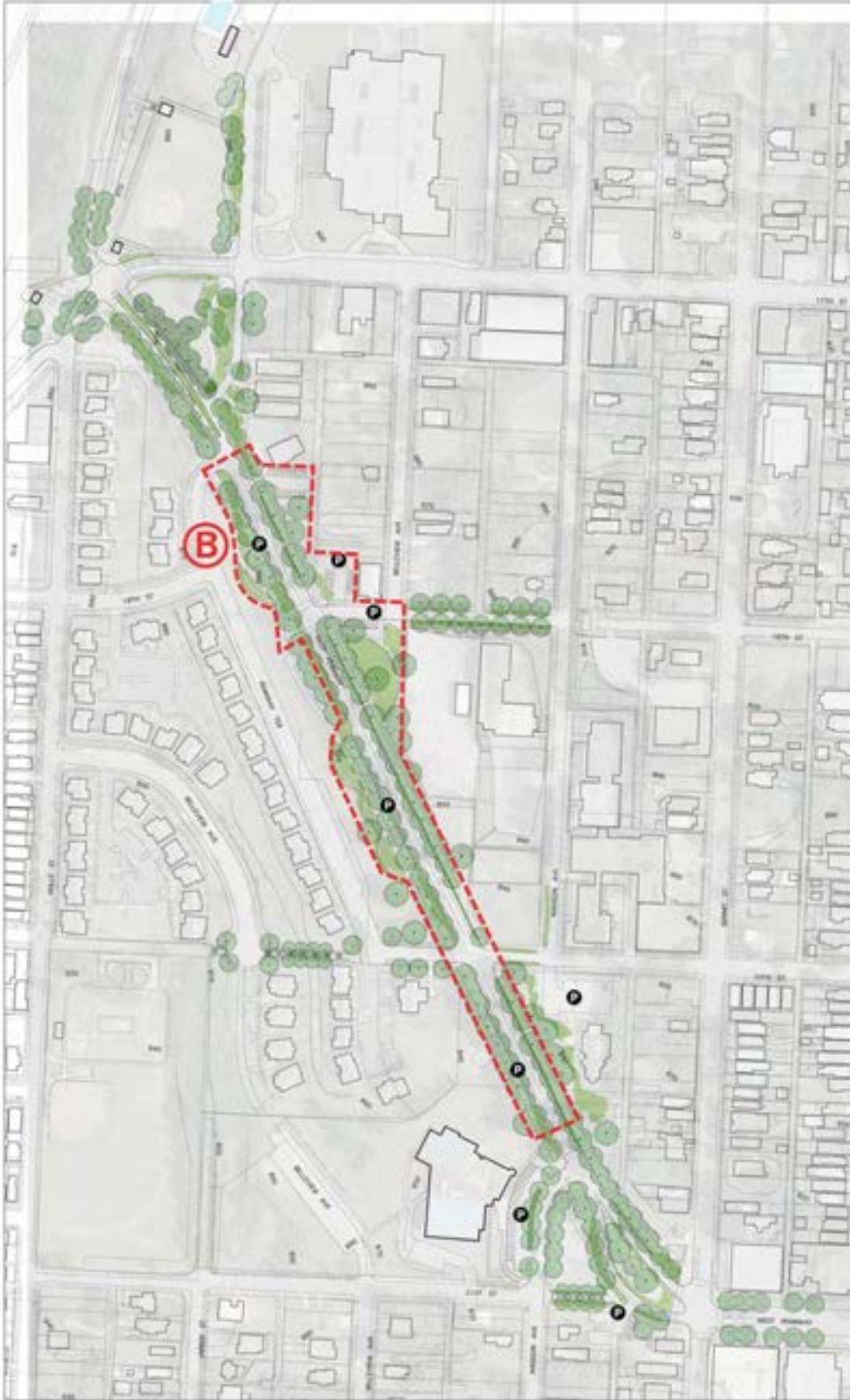
**\$574,747.20**

00 - PROFESSIONAL SERVICES					<b>\$613,695.00</b>
	Design Fees (Architectural / Engineering / Survey)	10.00%			\$239,478.00
	Legal				\$15,000.00
	Contractor Overhead & Profit	10.00%			\$239,478.00
	Build (Construction Management / Supervision)	5.00%			\$119,739.00

**TOTAL PROJECT COSTS**

**\$3,583,222.20**





Construction Estimate

C - 21st Street & West Pennway Intersection  
Intersection & Parking

DIVISIONS	Remarks	UNIT	QUANTITY	UNIT \$	TOTAL
01 - GENERAL CONDITIONS					<b>\$57,500.00</b>
Mobilization - Setup		LS	1	\$15,000.00	\$15,000.00
Construction Layout		LS	1	\$7,500.00	\$7,500.00
Construction Waste Mgmt.		LS	1	\$5,000.00	\$5,000.00
Temporary Facilities / Utilities / Detouring		LS	1	\$15,000.00	\$15,000.00
Construction Fencing		LF	5,000	\$2.00	\$10,000.00
Erosion Control		LS	1	\$5,000.00	\$5,000.00
02 - EXISTING CONDITIONS					<b>\$111,000.00</b>
Existing Curb & Concrete Removal		LS	1	\$20,000.00	\$20,000.00
Existing Asphalt & Subgrade Removal		SY	4,050	\$20.00	\$81,000.00
Existing Electrical Removal		LS	1	\$5,000.00	\$5,000.00
Existing Tree Removal		LS	1	\$5,000.00	\$5,000.00
31 - EARTHWORK - SITE PREPARATION					<b>\$60,000.00</b>
Site Clearing		LS	1	\$10,000.00	\$10,000.00
Earth Moving		LS	1	\$25,000.00	\$25,000.00
Dewatering		LS	1	\$5,000.00	\$5,000.00
Engineered Sub-Soils		LS	1	\$20,000.00	\$20,000.00
32 - PAVING					<b>\$332,711.00</b>
Asphalt Paving (overlay & 2" cold mil)		SY	1,252	\$12.00	\$15,024.00
Asphalt Paving (8")		SY	1,945	\$65.00	\$126,425.00
Concrete Paving, Driveway & Alley Repair		SY	441	\$75.00	\$33,075.00
Surface Striping		LS	1	\$2,500.00	\$2,500.00
Parking		EACH	17	\$3,000.00	\$51,000.00
ADA Crossings		LS	9	\$1,500.00	\$13,500.00
Concrete Sidewalk		SY	993	\$40.00	\$39,720.00
Concrete Curb & Gutter		LF	1,187	\$25.00	\$29,675.00
New Concrete Curb & Gutter / Edge Work		LF	681	\$32.00	\$21,792.00
32 - PLANTINGS					<b>\$142,749.50</b>
BMP Plantings		EACH	4,988	\$22.00	\$109,736.00
Plantings		EACH	347	\$15.00	\$5,205.00
Turf & Grasses		LS	1	\$1,632.00	\$1,632.00
Trees		EACH	5	\$1,500.00	\$7,500.00
mulch / rock		CY	26	\$100.00	\$2,600.00
Engineered Planting Soils / BMP/ plantings / mulch / rock		CY	185	\$86.90	\$16,076.50
32 - EXTERIOR IMPROVEMENTS					<b>\$135,400.00</b>
Wayfinding Signage		LS	1	\$5,000.00	\$8,000.00
Roadway Signage		LS	1	\$2,000.00	\$8,000.00
Grates / Inlets		EACH	7	\$3,500.00	\$24,500.00
Bollards		EACH	20	\$500.00	\$10,000.00
Pedestrian Stair		LS	1	\$35,000.00	\$35,000.00
Bike Racks		LS	4	\$750.00	\$3,000.00
Trash Receptacles / Recycling		EACH	6	\$750.00	\$4,500.00
Masonry Wall		LF	500	\$40.00	\$20,000.00
Benches		EACH	2	\$1,200.00	\$2,400.00
Public Art & Communication / Structures		LS	1	\$20,000.00	\$20,000.00
33 - UTILITIES					<b>\$184,600.00</b>
Basic Utilities		LS	1	\$25,000.00	\$25,000.00
Storm Utilities / Relocation		LS	1	\$46,200.00	\$46,200.00
Subdrainage		LS	1	\$3,400.00	\$3,400.00
Roadway Lighting		LS	1	\$50,000.00	\$50,000.00
General Electrical & Street Lighting		EACH	6	\$10,000.00	\$60,000.00
<b>TOTAL [COW]</b>					<b>\$912,960.50</b>
Contingency					20.00% \$182,592.10
Testing					2.00% \$18,259.21
Permit Fees					2.00% \$18,259.21
<b>Subtotal Construction</b>					<b>\$219,110.52</b>
00 - PROFESSIONAL SERVICES					<b>\$228,240.13</b>
Design Fees (Architectural / Engineering / Survey)			10.00%		\$91,296.05
Contractor Overhead & Profit			10.00%		\$91,296.05
Build (Construction Management / Supervision)			5.00%		\$45,648.03
<b>TOTAL PROJECT COSTS</b>					<b>\$1,360,311.15</b>





## Construction Estimate

D - 18th Street  
18th Street R.O.W.

DIVISIONS	Remarks	UNIT	QUANTITY	UNIT \$	TOTAL
<b>01 - GENERAL CONDITIONS</b>					<b>\$32,000.00</b>
Mobilization - Setup		LS	1	\$10,000.00	\$10,000.00
Construction Layout		LS	1	\$5,000.00	\$5,000.00
Construction Waste Mgmt.		LS	1	\$5,000.00	\$5,000.00
Temporary Facilities / Utilities / Detouring		LS	1	\$5,000.00	\$5,000.00
Construction Fencing		LF	1,000	\$2.00	\$2,000.00
Erosion Control		LS	1	\$5,000.00	\$5,000.00
<b>02 - EXISTING CONDITIONS</b>					<b>\$102,270.00</b>
Existing Curb & Concrete Removal		LS	1	\$35,000.00	\$35,000.00
Existing Asphalt & Subgrade Removal		SY	5,727	\$10.00	\$57,270.00
Existing Electrical Removal		LS	1	\$5,000.00	\$5,000.00
Existing Tree Removal		LS	1	\$5,000.00	\$5,000.00
<b>31 - EARTHWORK - SITE PREPARATION</b>					<b>\$35,000.00</b>
Site Clearing		LS	1	\$7,500.00	\$7,500.00
Earth Moving		LS	1	\$15,000.00	\$15,000.00
Dewatering		LS	1	\$5,000.00	\$5,000.00
Engineered Sub-Soils		LS	1	\$7,500.00	\$7,500.00
<b>32 -PAVING</b>					<b>\$169,290.00</b>
Asphalt Paving (8")		SY	4,077	\$20.00	\$81,540.00
Concrete Paving, Driveway & Alley Repair		SY	500	\$75.00	\$37,500.00
Surface Striping		LS	1	\$5,000.00	\$5,000.00
ADA Crossings		LS	7	\$1,500.00	\$10,500.00
Concrete Sidewalk		SY	400	\$40.00	\$16,000.00
Concrete Curb & Gutter		LF	750	\$25.00	\$18,750.00
<b>32 - PLANTINGS</b>					<b>\$84,500.00</b>
Planting Irrigation		LS	1	\$0.00	\$0.00
Turf & Grasses		SF	1,000	\$5.00	\$5,000.00
Trees		EACH	13	\$1,500.00	\$19,500.00
Engineered Planting Soils / BMP/ plantings / mulch / rock		CY	6,000	\$10.00	\$60,000.00
<b>32 - EXTERIOR IMPROVEMENTS</b>					<b>\$39,400.00</b>
Wayfinding Signage		LS	1	\$5,000.00	\$8,000.00
Roadway Signage		LS	1	\$1,000.00	\$8,000.00
Grates / Inlets		EACH	4	\$3,500.00	\$14,000.00
Bollards		EACH	8	\$500.00	\$4,000.00
Bike Racks		LS	2	\$750.00	\$1,500.00
Trash Receptacles / Recycling		EACH	2	\$750.00	\$1,500.00
Benches		EACH	2	\$1,200.00	\$2,400.00
<b>33 - UTILITIES</b>					<b>\$70,000.00</b>
Basic Utilities		LS	1	\$5,000.00	\$5,000.00
Storm Utilities / Relocation		LS	1	\$25,000.00	\$25,000.00
Roadway Lighting		LS	1	\$10,000.00	\$10,000.00
General Electrical & Street Lighting		EACH	3	\$10,000.00	\$30,000.00

**TOTAL [COW]**

**\$430,190.00**

Contingency

20.00%

\$86,038.00

Testing

2.00%

\$8,603.80

Permit Fees

2.00%

\$8,603.80

**Subtotal Construction**

**\$103,245.60**

<b>00 - PROFESSIONAL SERVICES</b>					<b>\$107,547.50</b>
Design Fees (Architectural / Engineering / Survey)		10.00%			\$43,019.00
Contractor Overhead & Profit		10.00%			\$43,019.00
Build (Construction Management / Supervision)		5.00%			\$21,509.50

**TOTAL PROJECT COSTS**

**\$640,983.10**





## Construction Estimate

E - Community Garden  
Community Plaza & Green Space

DIVISIONS	Remarks	UNIT	QUANTITY	UNIT \$	TOTAL
01 - GENERAL CONDITIONS					<b>\$34,000.00</b>
Mobilization - Setup		LS	1	\$10,000.00	\$10,000.00
Construction Layout		LS	1	\$5,000.00	\$5,000.00
Construction Waste Mgmt.		LS	1	\$5,000.00	\$5,000.00
Temporary Facilities / Utilities / Detouring		LS	1	\$5,000.00	\$5,000.00
Construction Fencing		LF	2,000	\$2.00	\$4,000.00
Erosion Control		LS	1	\$5,000.00	\$5,000.00
02 - EXISTING CONDITIONS					<b>\$85,000.00</b>
Existing Curb & Concrete Removal		LS	1	\$35,000.00	\$35,000.00
Existing Asphalt & Subgrade Removal		LS	1	\$35,000.00	\$35,000.00
Existing Electrical Removal		LS	1	\$7,500.00	\$7,500.00
Existing Tree Removal		LS	1	\$7,500.00	\$7,500.00
31 - EARTHWORK - SITE PREPARATION					<b>\$55,000.00</b>
Site Clearing		LS	1	\$10,000.00	\$10,000.00
Earth Moving		LS	1	\$20,000.00	\$20,000.00
Dewatering		LS	1	\$5,000.00	\$5,000.00
Engineered Sub-Soils		LS	1	\$20,000.00	\$20,000.00
32 - PAVING					<b>\$104,825.00</b>
Concrete Paving, Driveway & Alley Repair		SY	500	\$75.00	\$37,500.00
Surface Striping		LS	1	\$2,500.00	\$2,500.00
ADA Crossings		LS	4	\$1,500.00	\$6,000.00
Concrete Sidewalk		SY	500	\$40.00	\$20,000.00
Concrete Curb & Gutter		LF	273	\$25.00	\$6,825.00
New Concrete Curb & Gutter / Edge Work		LF	1,000	\$32.00	\$32,000.00
32 - PLANTINGS					<b>\$502,550.00</b>
Planting Irrigation		LS	1	\$0.00	\$0.00
Turf & Grasses		SF	4,092	\$5.00	\$20,460.00
Orchard Trees		EACH	24	\$1,500.00	\$36,000.00
Trees		EACH	5	\$1,500.00	\$7,500.00
Stormwater Park		LS	454	\$85.00	\$38,590.00
Engineered Planting Soils / BMP/ plantings / mulch / rock		SY	40,000	\$10.00	\$400,000.00
32 - EXTERIOR IMPROVEMENTS					<b>\$194,200.00</b>
Wayfinding Signage		LS	1	\$5,000.00	\$8,000.00
Grates / Inlets		EACH	3	\$3,500.00	\$10,500.00
Bollards		EACH	16	\$500.00	\$8,000.00
Bike Racks		LS	4	\$750.00	\$3,000.00
Trash Receptacles / Recycling		EACH	4	\$750.00	\$3,000.00
Masonry Wall		SFF	250	\$85.00	\$21,250.00
Benches		Each	4	\$1,200.00	\$4,800.00
Ag Bed Prep		SF	4,900	\$6.00	\$29,400.00
Boardwalk		LF	125	\$850.00	\$106,250.00
33 - UTILITIES					<b>\$115,000.00</b>
Basic Utilities		LS	1	\$5,000.00	\$5,000.00
Storm Utilities / Relocation		LS	1	\$20,000.00	\$20,000.00
Subdrainage		LS	1	\$10,000.00	\$10,000.00
General Electrical & Lighting		EACH	8	\$10,000.00	\$80,000.00
<b>TOTAL [COW]</b>					<b>\$1,005,575.00</b>
Contingency					20.00% \$201,115.00
Testing					2.00% \$20,111.50
Permit Fees					2.00% \$20,111.50
<b>Subtotal Construction</b>					<b>\$241,338.00</b>
00 - PROFESSIONAL SERVICES					\$216,115.00
Design Fees (Architectural / Engineering / Survey)		10.00%			\$100,557.50
Legal					\$15,000.00
Contractor Overhead & Profit		10.00%			\$100,557.50
Build (Construction Management / Supervision)		5.00%			\$0.00
<b>TOTAL PROJECT COSTS</b>					<b>\$1,463,028.00</b>





## Construction Estimate

F - 20th Street  
Stairs

DIVISIONS	Remarks	UNIT	QUANTITY	UNIT \$	TOTAL
01 - GENERAL CONDITIONS					\$22,000.00
Mobilization - Setup	LS	1	\$5,000.00	\$5,000.00	
Construction Layout	LS	1	\$5,000.00	\$5,000.00	
Construction Waste Mgmt.	LS	1	\$2,500.00	\$2,500.00	
Temporary Facilities / Utilities / Detouring	LS	1	\$2,500.00	\$2,500.00	
Construction Fencing	LF	1,000	\$2.00	\$2,000.00	
Erosion Control	LS	1	\$5,000.00	\$5,000.00	
02 - EXISTING CONDITIONS					\$35,000.00
Existing Curb & Concrete Removal	LS	1	\$25,000.00	\$25,000.00	
Existing Electrical Removal	LS	1	\$5,000.00	\$5,000.00	
Existing Tree Removal	LS	1	\$5,000.00	\$5,000.00	
31 - EARTHWORK - SITE PREPARATION					\$27,500.00
Site Clearing	LS	1	\$5,000.00	\$5,000.00	
Earth Moving	LS	1	\$10,000.00	\$10,000.00	
Dewatering	LS	1	\$5,000.00	\$5,000.00	
Engineered Sub-Soils	LS	1	\$7,500.00	\$7,500.00	
32 -PAVING					\$59,420.00
ADA Crossings	LS	2	\$1,500.00	\$3,000.00	
Concrete Sidewalk	SY	1,223	\$40.00	\$48,920.00	
New Concrete Curb & Gutter / Edge Work	LF	300	\$25.00	\$7,500.00	
32 - PLANTINGS					\$67,000.00
Planting Irrigation	LS	1	\$0.00	\$0.00	
Turf & Grasses	SF	1,000	\$5.00	\$5,000.00	
Trees	EACH	8	\$1,500.00	\$12,000.00	
Engineered Planting Soils / BMP/ plantings / mulch / rock	CY	5,000	\$10.00	\$50,000.00	
32 - EXTERIOR IMPROVEMENTS					\$71,500.00
Wayfinding Signage	LS	1	\$3,000.00	\$8,000.00	
Bollards	EACH	6	\$500.00	\$3,000.00	
Pedestrian Stair	LS	1	\$50,000.00	\$50,000.00	
Trash Receptacles / Recycling	EACH	2	\$750.00	\$1,500.00	
Masonry Wall	LF	300	\$30.00	\$9,000.00	
33 - UTILITIES					\$36,500.00
Basic Utilities	LS	1	\$5,000.00	\$5,000.00	
Subdrainage	LS	1	\$7,500.00	\$7,500.00	
General Electical & Lighting	EACH	8	\$3,000.00	\$24,000.00	
TOTAL [COW]					\$283,920.00
Contingency		20.00%		\$56,784.00	
Testing		2.00%		\$5,678.40	
Permit Fees		2.00%		\$5,678.40	
Subtotal Construction					\$68,140.80
00 - PROFESSIONAL SERVICES					\$70,980.00
Design Fees (Architectural / Engineering / Survey)	10.00%			\$28,392.00	
Contractor Overhead & Profit	10.00%			\$28,392.00	
Build (Construction Management / Supervision)	5.00%			\$14,196.00	
TOTAL PROJECT COSTS					\$423,040.80





### 5.3 Funding Opportunities

Advocating for future funding is the responsibility of the Westside neighbors and institutions most direct benefiting from improvements to the West Pennway Streetscape. Depending on funding opportunities, some of the recommended phases may be split into smaller projects or combined into larger projects than are defined here. Funding for these phases may come from a variety of local, state, federal and/or private sources including:

### 5.4 Maintenance

Implementation of the West Pennway Streetscape Plan is dependent upon the successful creation of a Friends of West Pennway group, working in close collaboration with various city agencies, most importantly Kansas City, Missouri, Parks and Recreation.

