

Floyd Avenue *Bike Boulevard*

Report to the Richmond City Planning Commission

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February 17, 2015

Overview

The City of Richmond Department of Public Works plans to redesign Floyd Avenue in a way that promotes walking and biking, while accommodating low-speed motor vehicle traffic. This project is an important first step in the City’s broader goal of creating a citywide bike network.

On June 6, 2013, the Richmond Area Metropolitan Planning Organization allocated funds for the planning, preliminary design, and community outreach associated with this project. The study limits are from Thompson Street (Carytown) to Laurel Street (Monroe Park).

After construction, Floyd Avenue is expected to be a preferred route for bike traffic between Carytown and Monroe Park. Floyd Avenue serves a predominantly residential area and has significant walking and biking traffic. The street provides access to Binford Middle School and William Fox Elementary School.

Innovative projects like this are sometimes referred to as “bike boulevards” or “neighborhood greenways.” The Floyd Avenue project is now being branded as an RVA Bike-Walk Street.

Typical street modifications include roundabouts, chicanes, speed lumps, and traffic diverters. All modes of transportation will have access to Floyd Avenue, but the street will be substantially enhanced for walking and bicycling.

Project Funding

The total city budget is \$571,773 for design and construction of the Floyd Avenue project.

Project Phase	Funding source	Amount
Study	Transportation Alternatives (TA)	\$40,000
	Capital Improvement Program (CIP)	\$10,000
	<i>subtotal</i>	<i>\$50,000</i>
Implementation	Transportation Alternatives (TA)	\$417,418
	Capital Improvement Program (CIP)	\$104,355
	<i>subtotal</i>	<i>\$521,773</i>
<i>total</i>		<i>\$571,773</i>

Responses to January 2015 City Planning Commission Issues

The City Planning Commission (CPC) requested additional information about seven (7) issues raised by the Urban Design Committee, plus three (3) issues raised by the Commission. The design team’s responses are below, with further resources attached in the appendices.

Urban Design Committee

1. **Addressing a lower speed limit** for the length of the project. This would be in the form a recommendation to City Council.

DPW will work with City Council (via ordinance) regarding 20 mph posted speed limit. An additional speed study will be conducted after the project is constructed (see bike-walk item #5).

2. Committing to a **full planting plan including street trees** along the extent of the bike/walk route.

157 vacant tree wells were documented during a site inventory on Floyd Avenue.

70 of those tree wells were on side streets, leaving 87 vacant wells to evaluate.

36 of those tree wells were determined to be unsuitable for replacement (utilities, other shrubs, lack of space, etc.), leaving 51 vacant tree wells suitable for replanting.

DPW will provide funding for the 51 replacement trees during the Spring 2015 planting season if the project is approved by City Planning Commission. The detailed tree well inventory is included in the appendices.



The detailed planting plan specifies which replacement trees should be small and which should be medium. The preferred trees are as follows:

- Preferred small tree: Yoshino Cherry
- Alternate small tree: Kousa Dogwood, Redbud, or equivalent
- Preferred medium tree: Black Gum
- Alternate medium tree: River Birch, Chinese Elm, or equivalent

3. Making the project fully accessible with **accessible ramps along the corridor.**

The project is in compliance with ADA guidelines. DPW, the City’s Bicycle & Pedestrian Coordinator, and VDOT agree that the Floyd Avenue Bike Boulevard project complies with ADA guidelines.

Three (3) ADA ramps will be installed directly with the Floyd Avenue Bike Boulevard (1 at Morris Street; 2 at Linden Street). The recent repaving project between Thompson Street and Boulevard includes 23 new ADA ramps on Floyd Avenue.

The table below is an inventory of ADA ramps compiled by DPW for locations east of Boulevard.

ADA Ramps - Floyd Ave Between Boulevard and Laurel Street

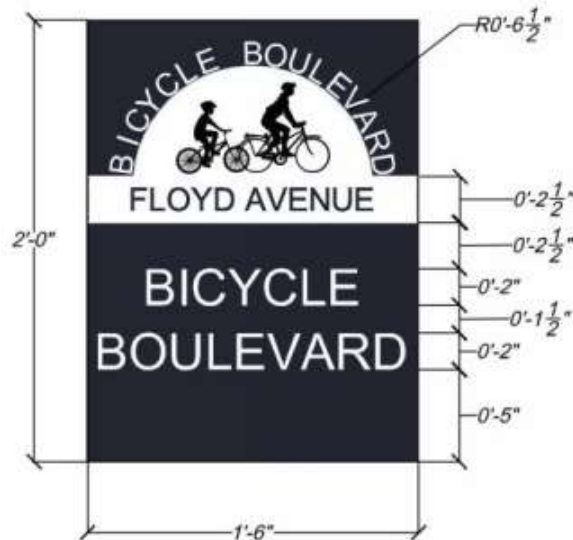
Intersection	NE	NW	SE	SW	Cost	T	NR	Ok	OB
Floyd @ Boulevard	Ok	Ok	OK	Ok	\$ -				4
Floyd @ Mulberry	T	T	T	T	\$ 4,800	4			
Floyd @ Robinson	T	T	T	T	\$ 4,800	4			
Floyd @ Davis	T	T	T	T	\$ 4,800	4			
Floyd @ Stafford	T	T	T	T	\$ 4,800	4			
Floyd @ Strawberry	T	T	T	T	\$ 4,800	4			
Floyd @ Shields	T	T	T	T	\$ 4,800	4			
Floyd @ Rowland	T	T	T	T	\$ 4,800	4			
Floyd @ Meadow	T	T	T	T	\$ 4,800	4			
Floyd @ Granby	T	T	T	T	\$ 4,800	4			
Floyd @ Allen	T	T	Ok	T	\$ 3,600	3			1
Floyd @ Vine	Ok	Ok	OK	Ok	\$ -				4
Floyd @ Lombardy	Ok	Ok	OK	Ok	\$ -				4
Floyd @ Plum	NR + T	2 OB*	Ok+NR	Ok+NR	\$ 8,700	1	3	2	2
Floyd @ Harvie	T	OB+T	T	OB+T	\$ 9,800	4			2
Floyd @ Morris	T	T	T	OK	\$ 3,600	3			1
Floyd @ Harrison	2T	2NR	T	NR+T	\$ 12,300	4	3		
Floyd @ Linden	T+NR	OK+OB			\$ 3,700	3	1	1	1
Floyd @ Cherry	T+NR	OK+NR	T	NR+T	\$ 11,100	3	2	1	
Floyd @ Laurel Street	Ok	Ok	OK	Ok	\$ -				4
					\$ 96,000	57	9	22	5

T - Truncate Dome (\$1,200 Each)
 NR - New Ramp (\$2,500 Each)
 OB - Physical Obstruction (No Ramp)
 OB* - Needs to be thoroughly evaluated
 OK - Existing Ramp

In addition to the bike boulevard project, DPW has requested approximately \$200,000 for the next fiscal year to continue updating ADA ramps throughout the city, a portion of which could be applied to Floyd Avenue.

4. Addressing unique signage and pavement markings and identity that celebrates this as a bike-walk trail as part of a larger wayfinding effort.

DPW and Planning Department have worked together to create a proposed Floyd Avenue Bike Boulevard sign that is compatible with the citywide wayfinding efforts.



CITY SIGNAGE STANDARDS:

- TYPOGRAPHY: FONTFONT PLUS SANS MEDIUM
- BACKGROUND COLOR: PANTONE 7547C (DARK BLUE)
- TEXT AND ACCENT COLOR: PANTONE WHITE

Six (6) signs are recommended during construction at key locations along the bike boulevard system.

- 1 sign entering system at Thompson Street
- 2 signs at Boulevard (one in each direction)
- 2 signs at Harrison Street (one in each direction)
- 1 sign entering system at Laurel Street



 SIGN LOCATION

Sign placement where people enter the bike boulevard (and possible new signs) would be evaluated as part of the 12-month post-construction evaluation (see also item #5).

The pavement marking plan also includes six (6) sharrows per block – three (3) in each direction. These sharrows will be the green highlighted style, also known as green backed sharrows.

- That the project be **evaluated 12 months after the completion of construction** and adjusted as needed, and that the evaluation involves the public and a presentation to the Planning Commission.

DPW will facilitate a project evaluation 12 months after the Floyd Avenue Bike Boulevard is constructed. The evaluation will include:

- Volumes (vehicles, bicycles, and pedestrians)
- Crashes
- Vehicle speeds
- Public opinion survey

- That the project **address lighting** along the length of the corridor.

The City of Richmond is currently implementing the Fan District Lighting plan, which includes Floyd Avenue between Boulevard and Harrison Street. Project details and a map are included on the following pages. The table below is a portion of the adopted Capital Improvement Program for Fiscal Years 2015 – 2019.

Capital Improvement Program								Sources and Uses Overview
FY 2015 - FY 2019 Adopted Capital Improvement Program								
Project Title	Pg	Originally Planned FY 2015	Adopted FY 2015	Planned				TOTAL
				FY2016	FY2017	FY2018	FY 2019	
Deepwater Terminal Road to Goodes Street	67	-	-	875,000	-	-	-	875,000
Fan Lighting Expansion	68	300,000	300,000	300,000	200,000	100,000	300,000	1,200,000
Forest Hill Avenue Sidewalk	69	-	180,000	-	-	-	-	180,000

The Fan District Lighting Project provides ornamental lights in the Fan District and removes the existing shoebox and cobra head fixtures. The Fall 2014 edition of the project newsletter describes the portions of the lighting project that have received funding.

The Fan District Lighting Project – Quarterly Newsletter

Fall 2014 Edition



PROJECT SUMMARY: The purpose of this project, as proposed by City Council, is to provide ornamental lights in the Fan District and remove the existing shoebox and cobra head street light fixtures. The project boundaries are from the Boulevard east to Harrison Street and from Main Street north to Broad Street (but not including any of these border streets). Construction will occur in phases as funding is made available. This newsletter addresses portions of the lighting project that have received funding.

The existing fixtures use standard High Pressure Sodium Vapor (HPSV) lamps with low color rendering (yellow light). The new lamps will improve color rendition by providing the appearance of a warm whiter color. In addition, overhead street light wiring will be replaced with underground service wiring. A map of the project boundaries is attached.

PROJECT STATUS:

CURRENT WORK:

Infrastructure improvements began in August on West Grace Street, from Ryland to Boulevard, that will allow for the removal of the existing shoebox light fixtures. The actual removal of the shoebox lights will begin this Fall.

PENDING WORK:

The next phase of the project will be along Mulberry Street from West Grace Street to Kensington Avenue. This phase will include the installation of 32 ornamental lights. Installation will begin Winter 2014.

FREQUENTLY ASKED QUESTIONS:

How will the historical fixture installation impact the existing street lights?

The City of Richmond Department of Public Utilities (DPU) does not anticipate any street lighting disruptions during construction. Removal of the shoe box style lights will not occur until after the historical fixtures are installed, connected and tested.

How were the style of poles and fixtures selected?

The City commissioned a consultant for the lighting design with input from the Fan District Association. Several styles of fixtures and lamps were pilot-tested in May 2009 along the 2600 block of West Grace Street and the 700 block of Mulberry Street.

Will parking be affected?

During construction, parking may be temporarily restricted. Efforts will be made to minimize the scope and duration of parking restrictions. The contractor will secure all obstructions so that pedestrian traffic will not be impeded after construction hours.

FOR QUESTIONS, CONCERNS OR COMMENTS ABOUT THE PROJECT, PLEASE CONTACT:

Daniel Rifenburg, Engineer III

Department of Public Utilities

Technical Services Division

804-646-8537

Daniel.Rifenburg@richmondgov.com



CITY OF RICHMOND

DEPARTMENT OF PUBLIC UTILITIES



MEDIA CONTACT:

Angela D. Fountain

Public Information Manager II

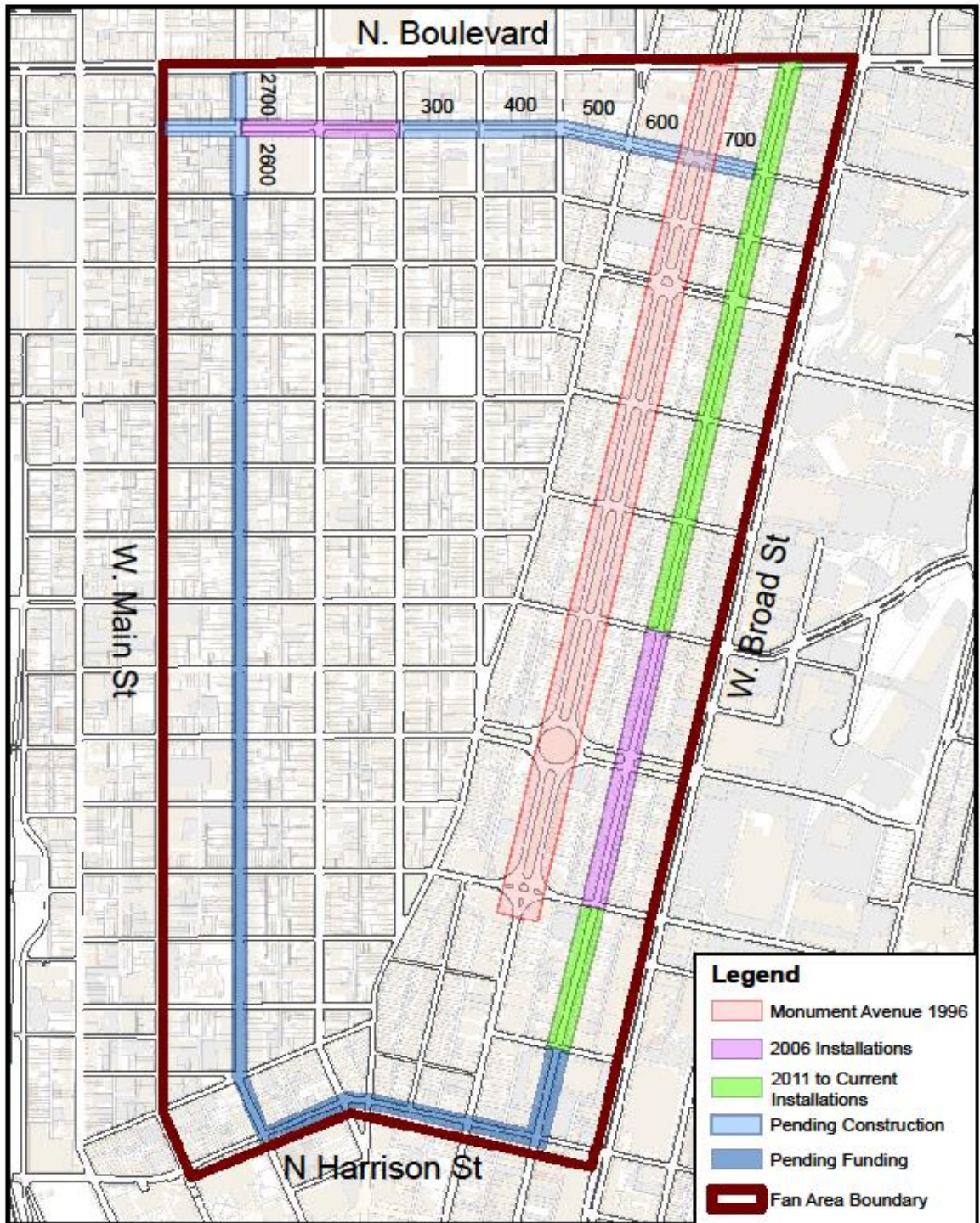
Department of Public Utilities

Communications Division

804-646-7323 or 804-922-0265

Angela.Fountain@richmondgov.com

Fan District Lighting Project - Map of Project Boundaries



PROJECT SEQUENCE

700 – 400 N. Mulberry

300 & 00 N. Mulberry

2700 – 2600 Floyd



CITY OF RICHMOND
DEPARTMENT OF PUBLIC UTILITIES



Mayor Dwight C. Jones
"Building the Best Richmond"

7. That the project more fully considers the **impact on parking** and considers limits on types or permits of parking specifically in Zones 1 and 2 of the project.

Response from Lynne Lancaster, City Parking:

“We have reviewed the proposed intersection designs for Floyd Avenue. It is our opinion that traffic circles will not interfere with on-street parking.

DPW (City Parking) will evaluate the current parking signage and loading zones to determine the potential for additional parking spaces. City Council can create a Residential Parking District between Boulevard and the current residential zone (approximately the 2000 to 2800 blocks of Floyd Avenue).”

It is important to note that parking districts, zones, etc. are separate initiatives by City staff.

City Planning Commission

1. Explore **pedestrian-activated signals** at Belmont and Harrison.

The Harrison Street intersection currently has pedestrian signals with countdown timers on each of intersection leg.

DPW uses safety data when assessing the use of pedestrian initiated signals at signalized intersections. The Richmond Police Department reported no pedestrian collisions during a 3-year period at the Harrison Street or Belmont Avenue intersections.

The existing signal at Belmont Avenue will be removed and replaced with a neighborhood traffic circle.

Crosswalks are generally considered a starting point for pedestrian accommodations (before pedestrian-activated signals). One of the criterion VDOT considers as sufficient demand for a crosswalk is at least 20 pedestrians per hour during the peak hour. At Belmont Avenue, the most recent pedestrian peak hour counts were 7 (morning), 4 (noon), and 15 (evening). Pedestrian-activated signals would be a higher threshold, and the intersection doesn't meet the crosswalk threshold. However, there are currently crosswalks at Belmont Avenue

and those crosswalks will be re-striped as part of the Floyd Avenue Bike Boulevard project.

DPW crash data shows two (2) crashes at Belmont Avenue in the last three (3) years of data (2010 – 2012), indicating the intersection is operating very safely. A neighborhood circle is expected to further increase the safety for people walking and riding bicycles.

2. **School X-ing or Ped X-ing markings** replace one of the sharrow markings on each block.

Floyd Avenue currently has “SCHOOL” pavement markings at Binford Middle School. Midblock pedestrian crossings are generally discouraged because drivers aren’t typically expecting them.

DPW plans to install three (3) sharrow pavement markings in each direction in front of Binford Middle School without adding new (non-standard) pedestrian crossing markings.

Ladder crosswalks currently exist on each side of Binford Middle School, and that style of high-visibility crossing will remain with the Floyd Avenue Bike Boulevard project.

3. **Safety should be the first priority.**

Bicycle boulevards have been around in the U.S. for over a decade, under various names. Their fundamental purpose is to provide a comfortable experience for people riding bikes in the street. A bicycle boulevard is not the same as a shared-use path, trail, or bike lane.

A bicycle boulevard is a street that allows all types of vehicles, but gives priority to bicycle safety and convenience.

Several cities on the west coast view bicycle boulevards as ongoing infrastructure projects. The projects are regularly evaluated in order to maximize safety. These streets are generally considered important components of a strong bicycle network.

Traffic circles

Traffic circles function as miniature roundabouts. The circular island helps reduce vehicle speeds at intersections. The City of Richmond has observed a 64% reduction in crashes at locations where circles have been installed. In addition to their traffic calming benefits, circles also provide an opportunity for landscape enhancements and provide a

visual gateway for a neighborhood. When traffic circles are used on bicycle boulevards or for traffic calming, it is common to put a stop sign on each of the side-street approaches.

Bicycle boulevards are intended to safely accommodate people riding bikes. One of the first safety issues to address is unwarranted stop signs. These cause excessive stop-and-go delay for bicycling, and are not considered to be useful for vehicular traffic calming.

U.S. Department of Transportation

The U.S. DOT has documented the dramatic safety benefits of roundabouts and traffic circles for many years. Data continues to show that traffic circles *improve safety* on neighborhood streets. All-way stop control is not considered to be a good form of traffic calming in the transportation engineering industry.

“Bicycle Boulevards/Walk-Bike Streets are most successful in areas with a grid-like or otherwise comprehensive roadway network where a parallel alternate route or routes can accommodate bicyclists and pedestrians choosing not to travel on the busier main route. Residents are usually in favor of them because of reduced and slower vehicle traffic.” – Federal Highway Administration

http://www.fhwa.dot.gov/environment/bicycle_pedestrian/ntpp/bicycle_blvds.cfm

Portland, OR

Portland still uses neighborhood circles as part of their traffic calming program.

They have, however, had safety concerns for bicyclists on streets that include a traffic circle and bike lanes. The Google Street View image below illustrates how cars would come uncomfortably close to a bicycle through the intersection. Floyd Avenue does not have bike lanes and the project is not proposing any bike lanes.

A person riding a bicycle through a Floyd Avenue intersection would either be riding in front or behind a car – not side by side.



[http://www.pdx.edu/ibpi/sites/www.pdx.edu/ibpi/files/BicycleBoulevardGuidebook\(optimized\).pdf](http://www.pdx.edu/ibpi/sites/www.pdx.edu/ibpi/files/BicycleBoulevardGuidebook(optimized).pdf)

Seattle, WA

“Seattle has really good safety experience with traffic circles with over 1200 of them installed in our city. They are an effective tool for solving angle collisions, which is the primary criteria that we use for their installation. The secondary benefit is, of course, creating friction for cut through traffic. I would consider traffic circles as a tool for bike-boulevards that can be used to reduce vehicle volumes/speeds along the route.”

– City Traffic Engineer, Seattle Department of Transportation

Curb extensions

Curb extensions are often called bump-outs, neck-downs or chokers. Their purpose is to extend the sidewalk in certain locations, most often at an intersection. The extensions create a more comfortable place for pedestrians to walk across a street by reducing the distance between sidewalks.

On-street parking can be clearly defined with the application of bulb-outs near intersections. The City of Richmond has constructed several as low-cost traffic calming devices. The design encourages slower turning speeds by drivers.

The design improves safety for people walking and for people driving across the side-streets. However, their use in the Fan was strongly opposed by residents who wish to preserve as much on-street parking as possible (legal or illegal).

Curb extensions or bump-outs are not generally viewed as interfering with on-street parking because they are installed where parking is typically *illegal*.

“Emergency access is often improved through the use of curb extensions if intersections are kept clear of parked cars. Fire engines and other emergency vehicles can climb a curb where they would not be able to move a parked car.” – Federal Highway Administration

The image below illustrates how line of sight is improved at curb extensions where illegal parking would be prevented.



Curb extensions
(Credit: Michele Weisbart)

Appendices

Street tree inventory

Signage and branding

Additional online bicycle boulevard resources

Street tree inventory

157 vacant tree wells were documented during a site inventory on Floyd Avenue.

70 of those tree wells were on side streets, leaving 87 vacant wells to evaluate.


36 of those tree wells were determined to be unsuitable for replacement (utilities, other shrubs, lack of space, etc.), leaving 51 vacant tree wells suitable for replanting.


The tree wells along length of the Floyd Avenue streetscape were evaluated for planting suitability and a recommendation was made as to the appropriately-sized replacement tree. The sizes of replacement trees were determined due to the presence of existing constraints such as overhead utility lines, tree well dimensions or adjacent tree canopy. A small tree species has been recommended in instances where existing constraints would compromise the growth and health of a medium-sized replacement tree.

- 147 vacant trees wells are listed for Floyd Avenue properties.
 - Exclusion of 70 tree wells located on side streets, not along the Floyd Avenue frontage.
 - Addition of 10 tree wells & replacement plants not captured on City Arborist tree well list:
 - 900 Floyd Avenue: 4 wells
 - 1015 Floyd Avenue: 2 wells
 - 1302 Floyd Avenue: 1 well
 - 1308 Floyd Avenue: 1 well
 - 1310 Floyd Avenue: 1 well
 - 2600 Floyd Avenue: 1 well

- 87 vacant tree wells were analyzed for replacement tree planting suitability.
 - Suitability evaluations were based on the following criteria:
 - Presence of utility line(s) and/or vault(s) = 14 unsuitable tree wells due to utility conflict.
 - Presence of existing tree and/or shrubs = 14 unsuitable tree wells due to existing plantings. The majority if these plantings have been recently installed by the City Arborist staff.
 - Location of tree well too close to existing access drive/street corner that would result in a visual barrier/safety concern = 4 unsuitable tree wells.
 - Inadequate spacing along parkway (linear planting strips) between utility poles/trees/walkways/etc. = 3 unsuitable tree wells.
 - Tree well has been paved over/no longer present = 1 unsuitable tree well.
 - **51 tree wells suitable for replacement plantings**
 - 13 Small Trees
 - 38 Medium Trees



- 
MEDIUM TREE REPLACEMENT:
 PREFERRED: BLACK GUM
 ALTERNATE: RIVER BIRCH, CHINESE ELM, OR EQUIVALENT

- 
SMALL TREE REPLACEMENT:
 PREFERRED: YOSHINO CHERRY
 ALTERNATE: KOUSA DOGWOOD, REDBUD, OR EQUIVALENT


TREE WELL REPLACEMENT EXHIBIT


RVA BIKE-WALK STREET: FLOYD AVENUE



WWW.TIMMONS.COM



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RVA BIKE-WALK STREET: FLOYD AVENUE



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
RVA BIKE-WALK STREET: FLOYD AVENUE



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
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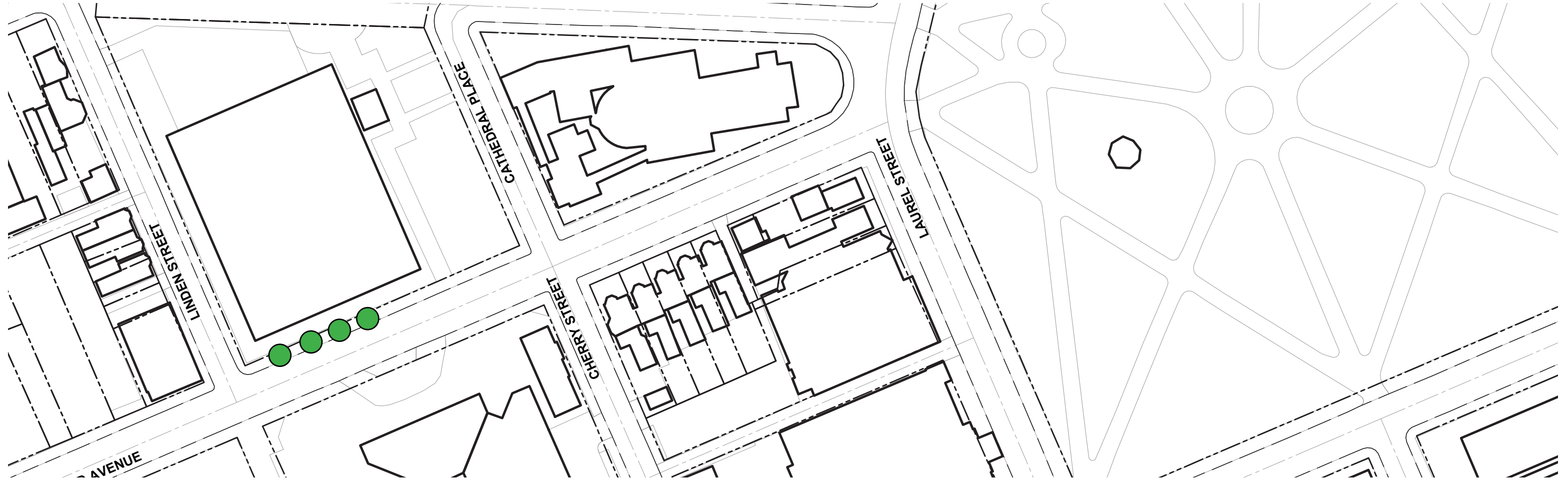
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TREE WELL REPLACEMENT EXHIBIT

RVA BIKE-WALK STREET: FLOYD AVENUE



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TREE WELL REPLACEMENT EXHIBIT

RVA BIKE-WALK STREET: FLOYD AVENUE



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Planting	Address	Street	Side	Site #
Vacant Site Medium	3514	Floyd Ave	Front	1
Vacant Site Medium	3510	Floyd Ave	Front	1
Vacant Site Small	3431	Floyd Ave	Front	1
Vacant Site Medium	3420	Floyd Ave	Front	1
Vacant Site Small	3417	Floyd Ave	Front	2
Vacant Site Medium	3412	Floyd Ave	Front	1
Vacant Site Small	3405	Floyd Ave	Front	1
Vacant Site Medium	3402	Floyd Ave	Front	1
Vacant Site Medium	3400	Floyd Ave	Front	2
Vacant Site Small	3324	Floyd Ave	Front	1
Vacant Site Small	3215	Floyd Ave	Front	1
Vacant Site Small	3147	Floyd Ave	Front	1
Vacant Site Medium	3112	Floyd Ave	Front	1
Vacant Site Small	3103	Floyd Ave	Front	1
Vacant Site Small	2921	Floyd Ave	Front	1
Vacant Site Medium	2822	Floyd Ave	Front	1
Vacant Site Medium	2810	Floyd Ave	Front	1
Vacant Site Small	2705	Floyd Ave	Front	1
Vacant Site Small	2625	Floyd Ave	Front	1
Vacant Site Small	2611	Floyd Ave	Front	1
Vacant Site Small	2609	Floyd Ave	Front	1
Vacant Site Small	2607	Floyd Ave	Front	1
Vacant Site Medium	2600	Floyd Ave	Front	4
Vacant Site Medium	2600	Floyd Ave	Front	6
Vacant Site Medium	2600	Floyd Ave	Front	10
Vacant Site Medium	2600	Floyd Ave	Front	11
Vacant Site Medium	2402	Floyd Ave	Front	1
Vacant Site Medium	2217	Floyd Ave	Front	1
Vacant Site Medium	2207	Floyd Ave	Front	1
Vacant Site Medium	2120	Floyd Ave	Front	1
Vacant Site Medium	2118	Floyd Ave	Front	1
Vacant Site Medium	2116	Floyd Ave	Front	1
Vacant Site Medium	2115	Floyd Ave	Front	1
Vacant Site Medium	2114	Floyd Ave	Front	1
Vacant Site Medium	2100	Floyd Ave	Front	1
Vacant Site Medium	2023	Floyd Ave	Front	1
Vacant Site Medium	1720	Floyd Ave	Front	1
Vacant Site Medium	1706	Floyd Ave	Front	1
Vacant Site Medium	1701	Floyd Ave	Front	5
Vacant Site Medium	1701	Floyd Ave	Front	1
Vacant Site Medium	1627	Floyd Ave	Front	2
Vacant Site Medium	1318	Floyd Ave	Front	1
Vacant Site Medium	1310	Floyd Ave	Front	1
Vacant Site Medium	1308	Floyd Ave	Front	1
Vacant Site Medium	1302	Floyd Ave	Front	1
Vacant Site Medium	1015	Floyd Ave	Front	2
Vacant Site Medium	1015	Floyd Ave	Front	4
Vacant Site Medium	900	Floyd Ave	Front	6
Vacant Site Medium	900	Floyd Ave	Front	7
Vacant Site Medium	900	Floyd Ave	Front	8
Vacant Site Medium	900	Floyd Ave	Front	9

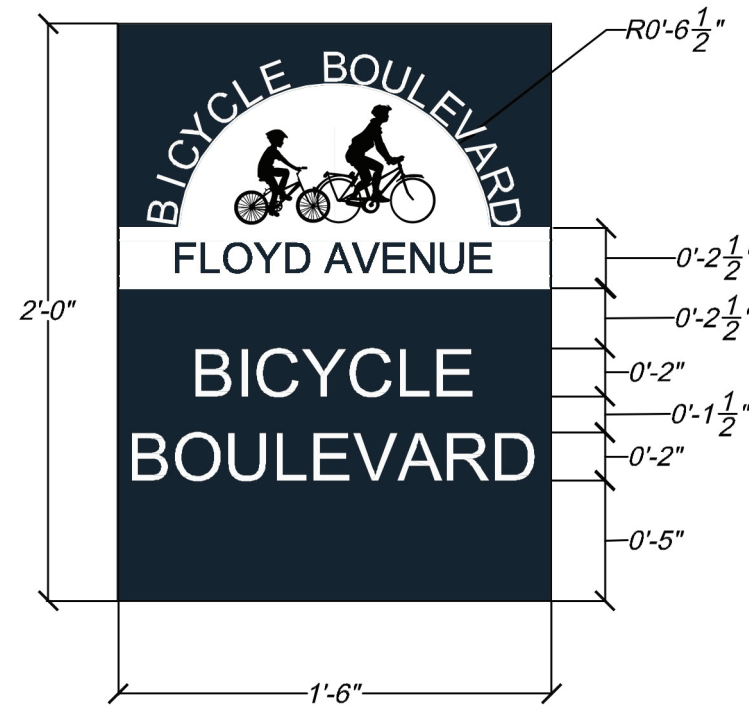
VACANT TREE WELL INVENTORY

RVA BIKE-WALK STREET: FLOYD AVENUE



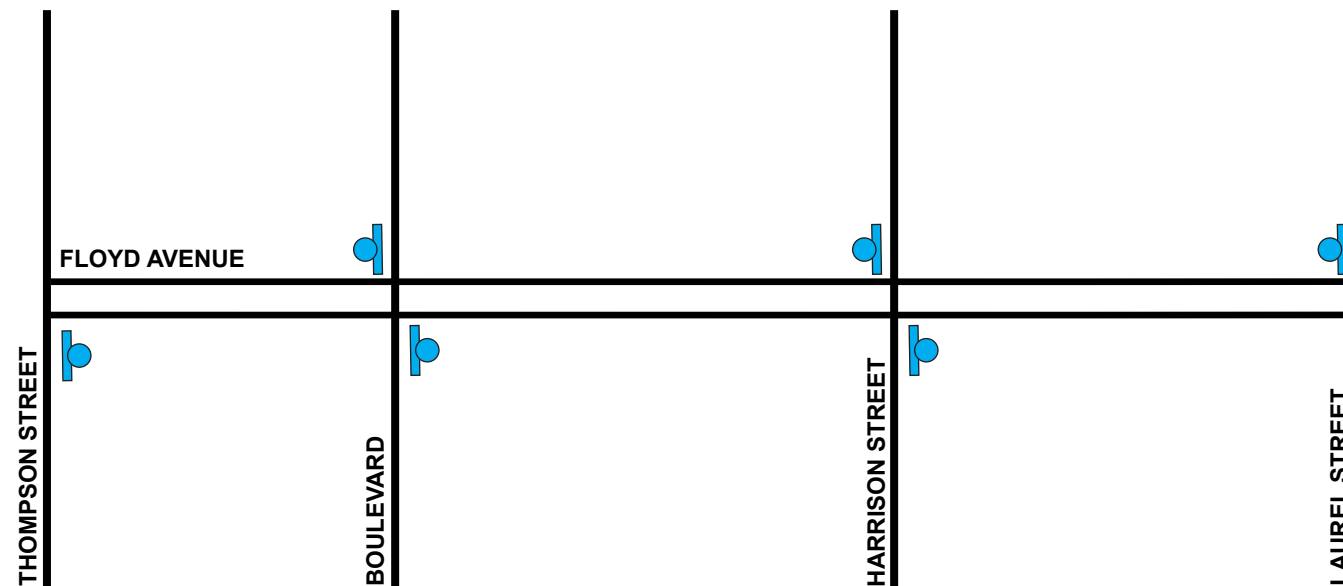
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Signage and branding



CITY SIGNAGE STANDARDS:

- TYPOGRAPHY: FONTFONT PLUS SANS MEDIUM
- BACKGROUND COLOR: PANTONE 7547C (DARK BLUE)
- TEXT AND ACCENT COLOR: PANTONE WHITE



 SIGN LOCATION

SIGNAGE PLACEMENT EXHIBIT

RVA BIKE-WALK STREET: FLOYD AVENUE

Additional online bicycle boulevard resources

Fundamentals of Bicycle Boulevard Planning & Design

[http://www.pdx.edu/ibpi/sites/www.pdx.edu.ibpi/files/BicycleBoulevardGuidebook\(optimized\).pdf](http://www.pdx.edu/ibpi/sites/www.pdx.edu.ibpi/files/BicycleBoulevardGuidebook(optimized).pdf)

City of Emeryville (CA) Bicycle Boulevard Treatments

<https://ca-emeryville.civicplus.com/DocumentCenter/Home/View/1829>

City of Denver (CO) Bike Boulevard Design Guidelines

<https://www.denvergov.org/Portals/193/documents/DLP/knox%20court/BikeBlvdDesignGuidelines.pdf>

Bicycle Transportation Alliance (OR)

http://bta4bikes.org/at_work/bikeboulevards.php

The Pedestrian and Bicycle Information Center

<http://www.bicyclinginfo.org/library/details.cfm?id=4155>