



DATE: December 12, 2022
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PROJECT NAME: City of Benicia Parking Plan Implementation: One-Way Streets and Angle Parking Analysis

In 2019, Walker conducted a Downtown Parking Study for the City of Benicia. The study found that while Benicia has available parking supply during peak times in downtown overall, First Street is highly utilized, with parking utilization above 85 percent for most of the day on weekends and during lunch dinner times on weekdays. The Benicia Downtown Parking Study recommended a set of achievable recommendations for parking management to meet the goals for parking and access to and within Downtown Benicia. The City is now considering several options to improve parking and access downtown including:

- Change on-street parallel parking spaces to angled parking spaces
- Lease parking space from private owners to create more public parking
- Pave existing B Street parking lot
- Change downtown streets from two-way to one-way
- Create an employee parking program to open up spaces on First Street
- Create a Parking Ambassador Program to enforce parking time limits
- Improve parking signage and wayfinding
- Build a bike lane on downtown streets

The following analysis estimates the change in parking supply available from converting six block segments from two-way travel into one-way streets with predominantly head-in angle parking. The reconfigurations are intended to be low cost, using paint, signs, and other basic interventions. The City of Benicia would need to conduct further traffic analysis and evaluation of any need for additional traffic control measures before enacting the changes.

Key Conclusions

- All studied blocks combined produce an estimated net gain of 44 parking spaces, which may be substantial enough to alleviate some of the parking congestion on 1st Street. The City can consider piecemeal options in which only some blocks are reconfigured, and more parking is preserved and created.
- The East F Street block produces a net loss of 20 spaces, and the East J Street block produces a net loss of 13 spaces, but the City may wish to consider the one-way with angle parking schemes anyway, in support of traffic calming and circulation improvement objectives.
- Any parking supply changes should be complemented with wayfinding and signage improvements, parking and access education efforts, and other strategies (many of which Walker addressed in previous studies).
- In considering whether to implement these street reconfigurations, parking supply should be just one of several factors. Changes to traffic circulation patterns and the introduction of more parking spaces will change driver behavior and ideally can lead to slower, safer, calmer vehicle operations and more opportunities for walking and bicycling connection improvements.

Table 1: Block Segment Capacity Analysis

Street Segment	Segment Location	Width ¹ (curb to curb)	Configuration	Existing Parking	Estimated Parking with Redesign	Net Gain (Loss) in Parking
E D Street	1 st to E 2 nd	50'	Dual angle parking	55	70	15
E F Street ²	1 st to E 2 nd	50'	Dual angle parking	68	48	(20)
W H Street ²	1 st to W 2 nd	51'	Dual angle parking	56	55	(1)
E H Street	1 st to E 2 nd	50'	Dual angle parking	46	64	18
E H Street	E 2 nd to E 3 rd	50'	Dual angle parking	50	80	30
W J Street	1 st to W 2 nd	40'	North – angle parking; South – parallel parking	49	64	15
E J Street ³	1 st to E 2 nd	34'	North – eastbound lane South – angle parking	44	31	(13)
TOTAL				368	412	44

¹All street segment measurements were made using ArcGIS.

²Angled parking stops mid-block

³Note that E J Street is 34' curb to curb and currently has parallel parking on both sides. Converting it to one-way with angle parking would allow parking only on one side of the street, thus reducing capacity. The City may wish to convert E J Street to one-way for reasons other than parking capacity, such as traffic calming and circulation routing. Alternatively, the City may wish to convert E J Street to one-way eastbound travel and preserve parallel parking on both sides as exists today. Depending on final engineering dimensions this may support one or two lanes of eastbound traffic.

Angled Parking and One-Way Streets

This analysis uses the same assumptions as the study memo on the topic prepared in January 2022. These include¹:

- 45-degree head-in angle parking that projects 18' from the curb and has a linear impact of 12' per stall.
- With one exception (that is noted) each street becomes one lane of travel with angle parking on both sides.

For the spatial analysis these additional assumptions and guidelines were used:

- No part of any parking space shall exist within 20' of a crosswalk.
- No part of any parking space shall overlap a clear zone projecting out from driveways into the street, as defined by the outer edge of any driveway pavement wing where it exists. A 0' offset is commonly used on slow traffic streets and when sight distances are sufficient. The City may wish to use a buffer between driveways and parking in some locations subject to engineering, traffic volumes, and traffic speeds. This could reduce the parking supply possible in some locations.

¹ Assumptions to be confirmed for real life conditions by City's traffic engineer.

- Parallel parking spaces are configured as 22’ long and 8’ wide. Twenty-two feet is a conservative estimate at the longer end of typical ranges. The City may decide to use a different standard length.

Table 1 summarizes the evaluation, showing the existing parking count, potential future parking count, and net gain or loss per segment. When all seven segments are combined there is a net gain of 44 spaces. Four of the seven segments produce significant parking supply gains. West E Street loses one space, East F Street loses 20 spaces, and East J Street loses 13 spaces. Though the reconfigurations of these three blocks result in a parking loss, the City may decide to proceed with these street reconfigurations to achieve other benefits, such as uniformity to the circulation pattern and traffic calming.

The streets shown in Figure 1 were evaluated. Each are converted to one-way traffic. Streets west of 1st Street flow westbound. Streets east of 1st Street flow eastbound. The arrows on Figure 1 describe this new circulation pattern.

Figure 2: Study Segment Blocks and Revised Circulation Patterns



Source: Google Earth aerial image; Walker Consultants illustration

The below diagrams¹ show a rough approximation of reconfiguration potential. Each diagram shows the 20’ clear zone from intersections and crosswalks (red lines and text), driveways and other no parking zones (grey lines and

text), parking space markings (while lines), and the estimated quantity of spaces achievable in each segment of the block. Labels also show the linear length of the various street features.

Figure 2: East D Street between 1st Street and East 2nd Street
 One lane eastbound with angle parking on both sides

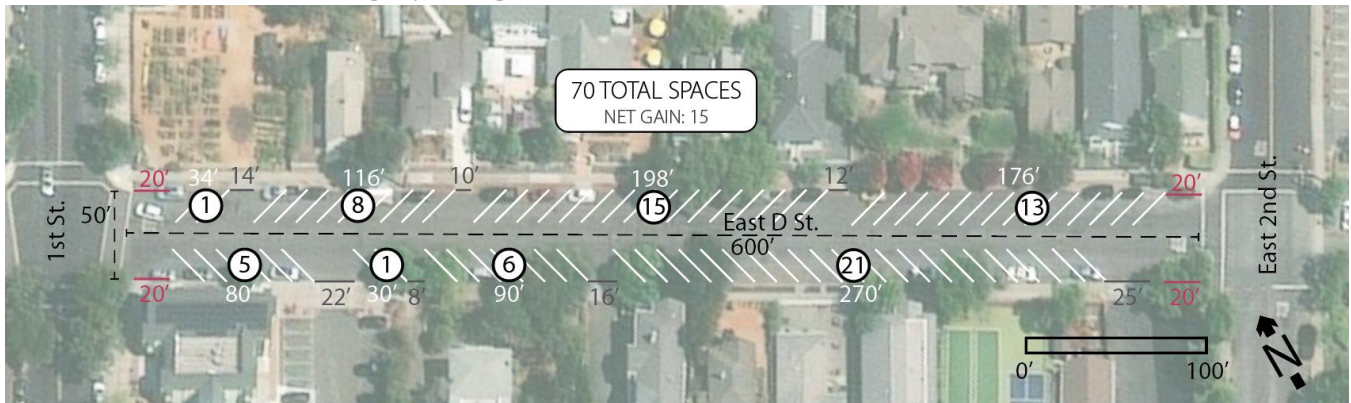
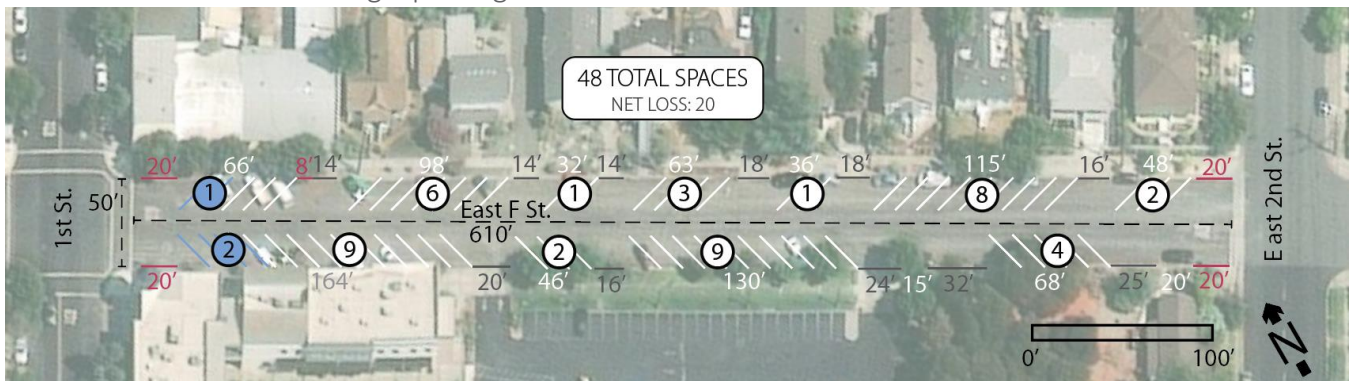


Figure 3: East F Street between 1st Street and East 2nd Street
 One lane eastbound with angle parking on both sides



Note: This reconfiguration preserves the three accessible spaces on the west end of the block (shown in blue).

Figure 4: West H Street between 1st Street and West 2nd Street
 One lane westbound with angle parking on both sides

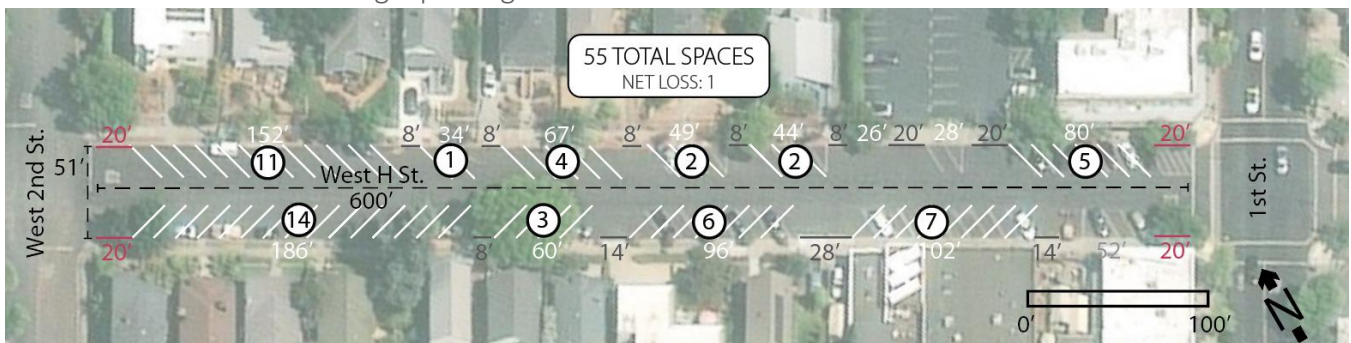


Figure 5: East H Street between 1st Street and East 2nd Street
 One lane eastbound with angle parking on both sides



Figure 6: East H Street between East 2nd Street and East 3rd Street
 One lane eastbound with angle parking on both sides

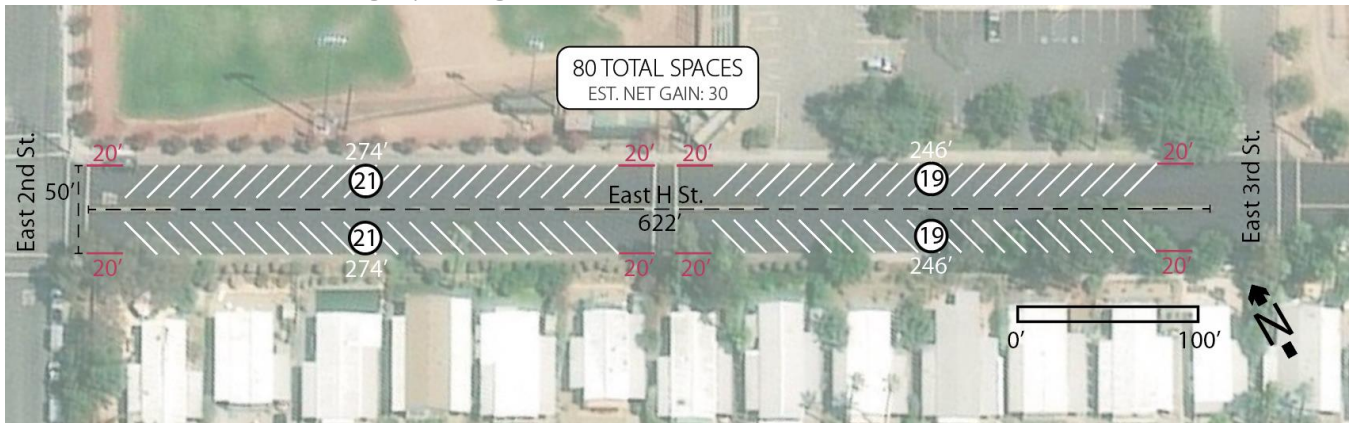
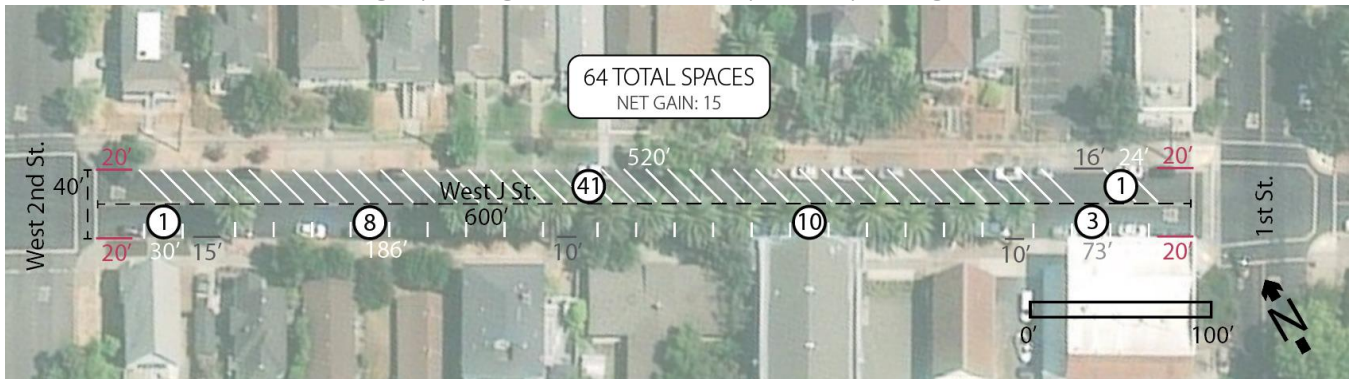
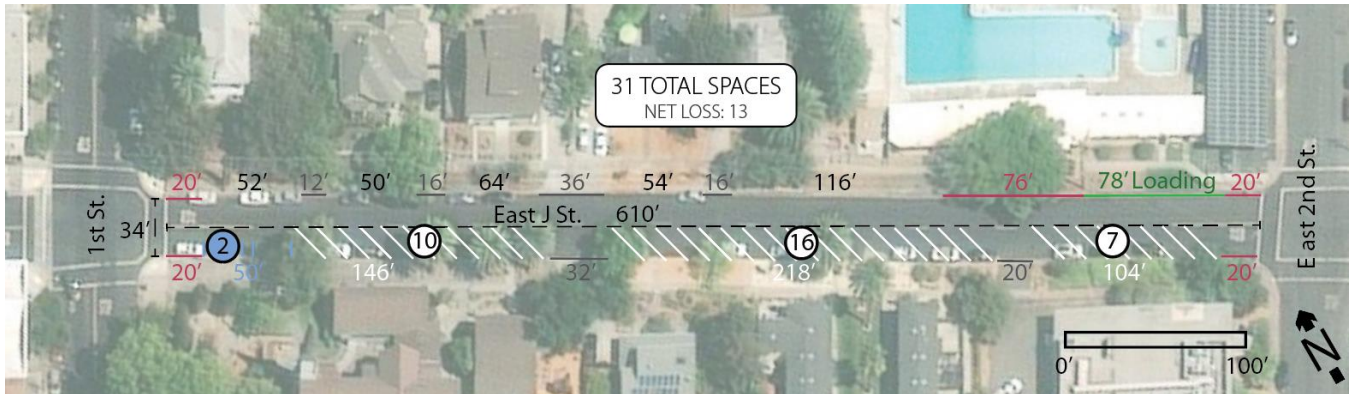


Figure 7: West J Street between 1st Street and West 2nd Street
 One lane westbound with angle parking on the north and parallel parking on the south



Note: This block reconfiguration includes a blend of angle parking on the north and parallel parking on the south.

Figure 8: East J Street between 1st Street and East 2nd Street
One or two lanes eastbound with angle parking on the south



Note: This block reconfiguration converts to one-way eastbound with angle parking on only the south side and results in net parking lose. This reconfiguration maintains the two accessible parking spaces on the west end south side.

ⁱ All diagrams produced by Walker Consultants using ESRI ArcMap base imagery, unless otherwise noted.