Ramp metering is a commonly used effective freeway management and operations strategy to reduce congestion and collisions. Regional benefits of ramp metering typically include mainline traffic speed increase, travel time reduction, crash reduction, improved travel time reliability, and emissions reduction. Ramp metering can reduce crashes on the mainline by as much as 36%, and ramp metering projects typically yield high benefit to cost (B/C) ratios that range from 2 to 10. Without ramp metering, multiple vehicles merge in tightly packed platoons, causing drivers on the mainline to slow down or even stop to allow vehicles to enter and avoid crashes.

Ramp meters can break up the platoons by controlling the rate at which vehicles enter the freeway from the on-ramp, allowing drivers to merge smoothly and reducing the need for mainline vehicles.

Ramp meters will initially be installed at six on-ramps to I-90 through the downtown Spokane area. Additional locations will likely be added in the future as funding becomes available.

### CONFIGURATIONS

#### Single Lane

On-ramp configured with one lane, and operates as a single lane during ramp metering.

#### Two Lane (existing)

On-ramp currently configured with two lanes and operates as a two-lane on-ramp during ramp metering.

#### Two Lane (retrofit)

On-ramp currently configured with one-lane, but wide enough to accommodate two lanes. No restriping is required.

- **Add stripe at stop bar to indicate two lanes**
- **Sign activated when ramp meter signal is on**

The green phase for both of the ramp meter lanes turns green at different times, staggering the release of vehicles in each on-ramp lane.

#### INITIAL SIX RAMP METERING LOCATIONS

- EB US 195 on-ramp
- EB Walnut on-ramp
- EB Monroe on-ramp
- EB Browne/Division on-ramp
- EB Hamilton on-ramp
- WB Division/Browne on-ramp

### METHOD | MAX. HRLY. VEHICLE CAPACITY | REC. LOCATIONS
---|---|---
**Single Lane Options**
- One Vehicle per Green | 900 | EB Monroe
  - Allow for one car to enter the freeway during each signal cycle.
- Two Vehicles per Green | 1200 | WB Browne/Division
  - Allow for two vehicles to enter the freeway during each green indication.
**Two-Lane Options**
- Alternating Greens | 1400 | EB US-195, EB Hamilton
  - The green phase for both of the ramp meter lanes turns green at different times, staggering the release of vehicles in each on-ramp lane.
- Tandem (simultaneous) Greens | 1700 | EB Walnut, EB Browne/Division
  - The green phase for both of the ramp meter lanes turns green at the same time, releasing two vehicles simultaneously. The vehicles then merge into a single lane before merging with freeway traffic.

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Recommended Ramp Configurations

**EB US 195**
- **Configuration:** 2-lane (retrofit)
- **Vehicle Release Method:** Alternating green phases
- **Available storage length (and lanes):** 570 ft (2 lanes)
- **Max. hourly rate (vehicles):**
  - EB: 1400
  - WB: 1450
- **Min. rate to avoid ramp queuing:**
  - EB: 1250
  - WB: 1000

**EB Walnut**
- **Configuration:** 2-lane (existing)
- **Vehicle Release Method:** Tandem green phases
- **Available storage length (and lanes):** 350 ft (2 lanes)
- **Max. hourly rate (vehicles):**
  - EB: 1700
  - WB: 1200
- **Min. rate to avoid ramp queuing:**
  - EB: 1450
  - WB: 1000

**WB Browne/Division**
- **Configuration:** Single-lane
- **Vehicle Release Method:** Two vehicles per green
- **Available storage length (and lanes):** 500 ft (1 lane)
- **Max. hourly rate (vehicles):**
  - EB: 1200
  - WB: 1000
- **Min. rate to avoid ramp queuing:**
  - EB: 1450
  - WB: 1050

**EB Monroe**
- **Configuration:** Single-lane
- **Vehicle Release Method:** One vehicle per green
- **Available storage length (and lanes):** 720 ft (1 lane)
- **Max. hourly rate (vehicles):**
  - EB: 900
  - WB: 900
- **Min. rate to avoid ramp queuing:**
  - EB: 900
  - WB: 900

**EB Browne/Division**
- **Configuration:** 2-lane (existing)
- **Vehicle Release Method:** Tandem green phases
- **Available storage length (and lanes):** 760 ft (2 lanes)
- **Max. hourly rate (vehicles):**
  - EB: 1700
  - WB: 1600
- **Min. rate to avoid ramp queuing:**
  - EB: 1600
  - WB: 1050

**EB Hamilton**
- **Configuration:** 2-lane (retrofit)
- **Vehicle Release Method:** Alternating green phases
- **Available storage length (and lanes):** 1500 ft (2 lanes)
- **Max. hourly rate (vehicles):**
  - EB: 1400
  - WB: 1050
- **Min. rate to avoid ramp queuing:**
  - EB: 1050
  - WB: 1000