

**IMPLEMENTATION AND OPERATIONAL OF WEEKEND EASTBOUND  
US 26 (SUNSET HIGHWAY) RAMP METERING SYSTEM**

Oregon Department of Transportation  
Region 1 – Traffic

December 2003

## **INTRODUCTION**

The US 26 Highway is a route linking the Portland area to the coast. It is built to freeway standards and carries recreational traffic as well as very heavy traffic commuter in both directions at most times of the day. There have been meters in operation during the week (a.m. and p.m. peak period) to address commuter traffic but weekend operation had not been considered before.

The Oregon Department of Transportation (ODOT) Region 1 traffic Unit had decided to operate the ramp meter system on the US 26 eastbound (EB) on weekends. Weekend ramp meter operation began on Saturday August 25<sup>th</sup> and on Sunday August 26<sup>th</sup>, 2001.

Before ODOT implemented weekend ramp metering, we reviewed traffic volume and speed data on the Sunset Highway for the previous year. From this data we established the hours of weekend operation and the metering rates for the ramp meters. Based on this data, we determined the highway congestion wasn't as severe from January through April as it was the rest of the year. Therefore, to avoid imposing delays on the motoring public unnecessarily, we decided to turn off the ramp meters, on weekends, during those months.

### **Problem Statement**

Oregon Department of Transportation (ODOT) Region 1 Traffic Unit has received an increased number of complaints about congestion during the weekends on the Sunset Highway within the past few years. It was decided to investigate the possibility of ramp metering on the weekends to address this.

### **Scope**

It was decided to limit the scope of the investigation to eastbound operation only due to resources, time frame, and the low number of metered westbound ramps.

## **Objectives**

The primary goal of this project is to help improving freeway traffic flow by regulating the amount of traffic entering the freeway to help alleviate traffic congestion downstream and also to eliminate the stop and go maneuvers prevalent on the highways.

### **RAMP METER TIMING PROJECT**

In response to the recurring weekend traffic congestion on the eastbound US 26 Highway, ODOT has implemented ramp metering on the eastbound on-ramps at Helvetia Road, Cornelius Pass Road, 185<sup>th</sup> Avenue, Cornell Road, Murray Blvd., Cedar Hills Blvd., Park Way and ORE 217 from 12:00 noon to 6:00 p.m. Weekend ramp meters operation has been in effect from May through December since August 2001. As is the case for the weekday ramp metering, part of the reason for metering the outer on-ramps (Helvetia and Cornelius Pass Road) on the weekends is to regulate the amount of traffic entering the freeway to help alleviate traffic congestion downstream (east of 185<sup>th</sup> Avenue). However, freeway traffic volumes at these outer on-ramps are often higher on weekends than on weekdays.

The meter rate is determined base on the traffic volume of the freeway and the on-ramp including the capacity of the freeway downstream. The amount of vehicle storage space on the on-ramp is also taken into consideration in an effort to avoid backing traffic up onto the local streets. A ramp with higher volume and short storage length has a faster meter rate to prevent queues that backing up onto the city streets.

#### **Conditions before the operation of weekend US 26 ramp meters:**

ODOT has collected data and compiled the freeway traffic volumes for one typical Saturday and one typical Sunday for each month of the entire year. The data shows that the most critical locations are at Murray Blvd. and Cornell Road. The table below

summarizes the number of 15 minutes intervals during which the average speed for all vehicles in all lanes drops below 30 mph for the entire 15 minutes period.

It shows that at Murray Road and Cornell Road, from May through December, between 12:00 noon and 6:00 p.m. freeway traffic is significantly congested. At times the freeway speed has dropped dramatically below 30 mph.

Month	Saturday		Sunday	
	Cornell # intervals<30 mph	Murray # intervals<30 mph	Cornell # intervals<30 mph	Murray # intervals<30 mph
January	5	4	0	0
February	0	4	0	0
March	1	1	0	0
April	0	0	0	0
May	12	12	5	0
June	5	7	1	3
July	5	0	17	0
August	16	0	29	1
September	11	5	7	1
October	24	25	13	3
November	13	15	0	0
December	14	9	0	0

Figures 1, 3, 4, 6, 7, 8 and 9 display typical weekend traffic operations, without ramp metering, at the critical locations on the Sunset Highway eastbound. They illustrate that during the noon to 6 p.m. time frame, freeway speeds drop below 30 mph. As speed decreases below 30 mph, the volume also decreases. This means fewer people get through the corridor.

The tables below are the summary of travel time studies without metering operation:

- 1\* Location: From Helvetia through Sylvan Interchange (10.12 miles)  
Estimation of free flow travelling time: At 55 mph it takes 11 minutes

This table shows total time to travel from Helvetia to Sylvan Interchange:

Start Time	<b>Saturday</b> 7/28/2001 Total Travel Time	<b>Sunday</b> 7/29/2001 Total Travel Time
13:00 p.m.	16.6 minutes	16.3 minutes
14:00 p.m.	14 minutes	15.7 minutes
15:00 p.m.	11.4 minutes	14.6 minutes

2\* Location: From Heveltia through the tunnel (12.18 miles)

Estimation of free flow travelling time: At 55 mph it takes 13 minutes

This table shows total time to travel from Helvetia to tunnel:

Start Time	<b>Saturday</b> 7/28/2001 Total Travel Time	<b>Sunday</b> 7/29/2001 Total Travel Time
13:00 p.m.	19 minutes	19.8 minutes
14:00 p.m.	16.4 minutes	18.3 minutes
15:00 p.m.	22.6 minutes	17 minutes

**Conditions after the operation of weekend US 26 ramp meters:**

Data used for the analysis of this report were collected in the same month for the purpose of comparison. The graphs in Exhibit 1 through 5 represents the data that was collected during the time the ramp meters are off (they are named as “Figures 1 through 5 before” which means before the ramp meters are turned on). The graphs in Exhibit 1A through 5A represents the data that was collected during the time the ramp meters are in operation. Exhibit 1A through 5 A show that at Murray Blvd. and Cornell Road, between 12:00 noon and 6:00 p.m. freeway traffic has significantly improved. At times the freeway speed has increased above 30 mph. As speed increases, the volume also increases when the ramp meters are in operation. Exhibit # 1 and Exhibit # 4 represent one of the critical locations on the eastbound Sunset Highway. It illustrates within that specific time frame, freeway speeds drop below 30 mph. As speed decreases below 30

mph, the volume also decreases. This means fewer people get through the corridor when the ramp meters are not on. The table below summarizes the amounts of traffic that could move through this corridor with and without ramp metering.

EB US 26 @ Cornell & Murray	With No Metering	With Metering
	Volume (veh/15 minutes) Between 12:00 noon and 17:30 p.m.	Volume (veh/15 minutes) Between 12:00 noon and 17:30 p.m.
Exhibit 1-Cornell	13,951	15,011
Exhibit 2-Cornell	14,299	14,651
Exhibit 3-Cornell	15,646	15,740
Exhibit 4-Murray	16,194	17,809
Exhibit 5-Murray	17,307	18,031

This table shows that when the ramp meters are on (Exhibit 1A through 5A), we can accommodate more vehicles on the freeway corridor with ramp meters in operation than without between noon and 17:30 p.m. Even when speeds do not increase very much, volume has increased.

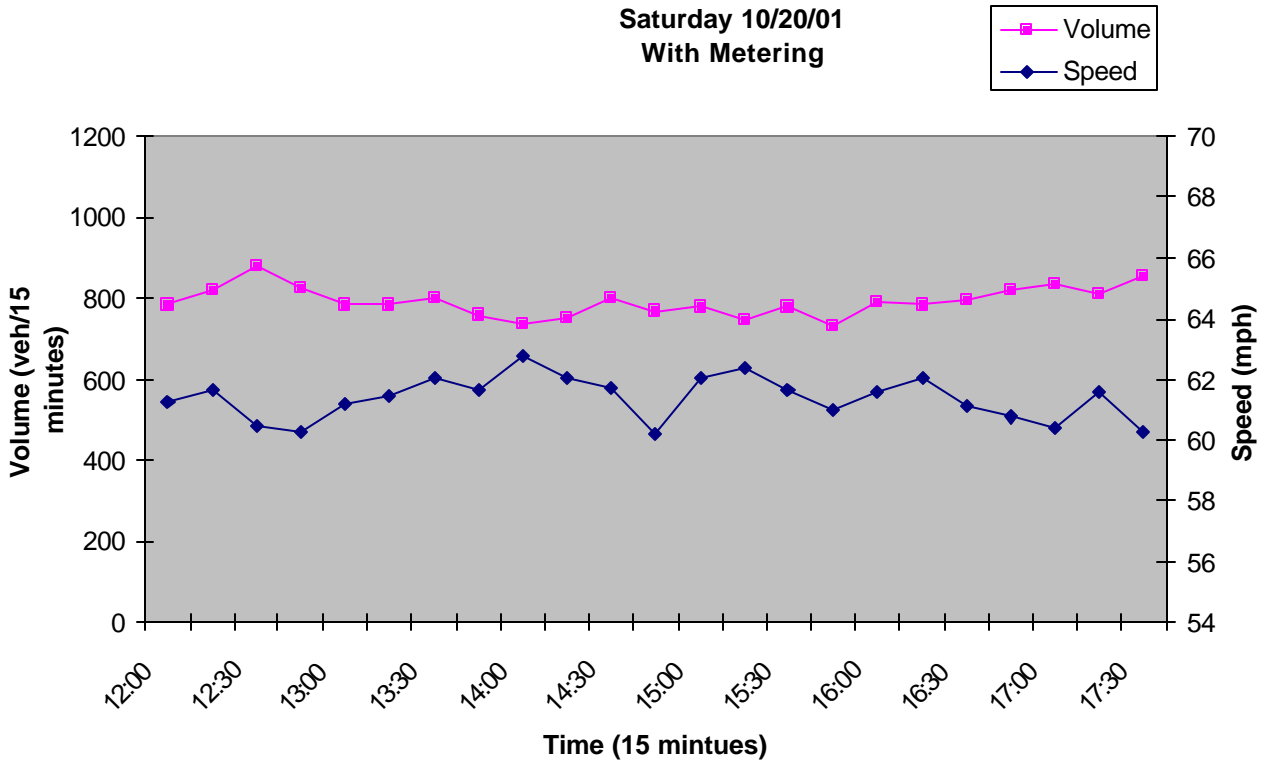
### **WEEKEND US 26 RAMP METER SYSTEM PERFORMANCE EVALUATION**

Observations show that freeway traffic has significantly improved. As an example, at Cornell or Murray, the average speed during the weekend peak was around 30 mph or less. After ramp metering was implemented the average speed has increased up to 55 mph or more during the weekend peak periods. In most cases freeway speeds have increased which decreases travel time. Even when speeds do not increase very much volume has increased. This means we can accommodate more vehicles on the corridor with ramp meters in operation than without.

ODOT continues to monitor traffic conditions on the freeway to ensure the ramp meter operation is benefiting the freeway without imposing undue delays on the on-ramps.

Also, we are currently working to incorporate a traffic-responsive ramp metering system into our traffic control software. This system will be able to monitor traffic conditions on the freeway and turn the ramp meters on and off as needed in response to current freeway congestion. This could lead to a longer metered period on days that traffic is particularly heavy and a shorter metered period when traffic is unusually light. Eventually, ramp meters will automatically adjust their timing based on traffic volumes on the freeway, and will shut off when traffic volumes are low.

Murray to EB US 26  
Saturday 10/20/01  
With Metering



Murray to EB US 26  
Sunday 10/21/01  
With Metering

