Background

Seawall Blvd. between Ferry Road (SH 87) and Boddecker Rd is a 4-lane undivided roadway. Currently, the asphalt pavement is deteriorating and is in very poor condition. Nearly the entire pavement is cracked with a majority of pavement gaps greater than 1/8 inch wide. The pavement damage has been determined to be severe to very severe. Continued degradation will result in impaired travel due to the creation of large potholes, ridges, and cracks. This damage presents a mobility challenge due to the substantial traffic present during peak tourist times as well as the potential for impaired travel during an evacuation event.

Maintenance Scenario

One way to maintain the function of the roadway is to conduct a flexible pavement structure repair.

Flexible pavement structure repair will repair localized sections of flexible pavement structure including subgrade, base, and surfacing. However, the expected life extension for flexible pavement structure repair is between 3 to 5 years. Therefore, at this repair will need to be completed at least 5 times in order to ensure a minimum 20 year useful maintenance period.

Maintenance Cost

Seawall Blvd between Ferry Road (SH 87) and Boddecker Rd is 2.07 miles long. The section between SH 87 and E Beach Drive (Section 1) is 0.26 mile (1,385 feet) long and the width of asphalt pavement is 75 feet. The section between E Beach Drive and Boddecker Rd (Section 2) is 1.81 miles (9,548 feet) long and the width of asphalt pavement is 40 feet (***Figure 1***).

According to *TxDOT 2014 Average Low Bid Unit Prices (http://www.txdot.gov/business/letting-bids/average-low-bid-unit-prices.html)*, the cost for flexible pavement structure repair of asphalt pavement is $\$48/yd^2$.

Assume that 30% of the existing asphalt pavement needs flexible pavement structure repair and would have to be done five times within next 20 years, the total cost for flexible pavement structure repair would be:

$$\begin{aligned} Cost_{\text{Full Depth Repair}} &= Cost_{Section1} + Cost_{Section2} \\ &= L_{Section1} \times W_{Section1} \times 0.11111 \times P \times F \times C + L_{Section2} \times W_{Section2} \times 0.11111 \times P \times F \times C \\ &= 1{,}385 \times 75 \times 0.11111 \times \$48 \times 5 \times 30\% + 9{,}548 \times 40 \times 0.11111 \times \$48 \times 5 \times 30\% \\ &= \$3{,}885{,}971.36 \end{aligned}$$

Where $L_{Section1}$ is the project length of Section 1, which is 1,385 feet
$L_{Section2}$ is the project length of Section 2, which is 9,548 feet
$W_{Section1}$ is the width of asphalt pavement of Section 1, which is 75 feet
$W_{Section2}$ is the width of asphalt pavement of Section 2, which is 40 feet

P is the unit price of flexible pavement structure repair

F is the flexible pavement structure repair frequency, which is 5 during the next 20 years

C is the percentage of asphalt pavement needs flexible pavement structure repair

Repavement Scenario

Another way to maintain the function of the roadway is to repave Seawall Blvd, which the proposed project intends to do. The total estimated cost of repaving Seawall Blvd including milling and overlaying the existing 4-lane roadway from Ferry Road (SH 87) and Boddecker Rd is $1,500,000.00. A repaved roadway can be expected to last for 20 years.

Benefit Cost Analysis

In summary, the projected maintenance cost of the current roadway conditions can be estimated at $3,885,971.36, which is more than half of the repavement cost. In addition, the remaining 70% of pavement (the portion in "fair" condition now) will need maintenance within an additional 10 years. Therefore, the total cost of maintenance within the next 20 years will be higher than the repavement cost. Compared with maintenance, repaving seawall Blvd. from Ferry Road (SH 87) and Boddecker Rd is the preferred alternative economically.

Figure 1: Section Map