

2019

State of the Pavement Report



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EXECUTIVE SUMMARY

As the steward of the State Highway System (S.H.S.), the California Department of Transportation (Caltrans) is responsible for maintaining over 50,000 lane-miles of pavement along more than 255 state and interstate highways. The State of the Pavement Report presents the latest pavement condition of the S.H.S., recent pavement project expenditures, and financial plan for future pavement improvements.

Caltrans conducts an automated pavement condition survey (A.P.C.S.) to collect pavement data at highway speeds for all lanes along the S.H.S. A.P.C.S. vehicles are equipped with various on-board equipment, high-definition cameras, and laser sensors to collect pavement images and pavement surface profiles. Pavement condition is reported for every 0.1-mile.

The 2019 State of the Pavement Report is based on the A.P.C.S. data collected in the 2019 calendar year. The difference in the total lane-miles collected between 2019 compared to 2018 may be attributed to right-of-way relinquishments, new roadway pavement segments, new roadway re-alignments, or pavement locations where conditions could not be collected such as roadway closures for construction activities. The report presents pavement condition in accordance with two analysis methodologies:

- 1) The National Highway Performance Program's (N.H.P.P.) pavement performance measures codified under Title 23, Code of Federal Regulations, Part 490, Subpart C (23 C.F.R. 490, Subpart C);
- 2) The Caltrans pavement rating system.

The N.H.P.P. measures pavement performance as *Good*, *Fair*, and *Poor* based on an assessment of several distress metrics combined. Table 1 presents the 2018 and 2019 statewide pavement condition by roadway classification, based on federal performance measures. The percentage of *Good* pavement increased for all three roadway classes in 2019 compared to 2018. The percentage of *Fair* pavement decreased for all three roadway classes. The percentage of *Poor* pavement decreased for Class 1 and Class 3, and it remained relatively the same for Class 2.

The Caltrans pavement rating system uses a different methodology than the federal measures. Caltrans designates the color *Green* for pavement with no distress or very low distress, the color *Yellow* for pavement with minor surface distress, and the color *Red* for pavement with structural distress or poor ride quality. Through this monitoring and assessment effort, Caltrans can proactively apply the most cost-effective treatments to minimize pavement deterioration and bring it to a state of good repair. Table 2 presents the 2018 and 2019 statewide pavement condition by roadway classification, based on the Caltrans rating system. The percentage of *Green* pavement increased for Class 1 and

Class 3 while it decreased for Class 2 in 2019 compared to 2018. The percentage of Yellow pavement decreased for Class 1, and it increased for Class 2 and Class 3. The percentage of Red pavement decreased for all three roadway classes.

TABLE 1. STATEWIDE PAVEMENT CONDITION SUMMARY BY ROADWAY CLASSIFICATION, BASED ON FEDERAL PERFORMANCE MEASURES

Roadway Class	2018 Good Lane-Miles	2018 Fair Lane-Miles	2018 Poor Lane-Miles	2018 Sub-Total	2019 Good Lane-Miles	2019 Fair Lane-Miles	2019 Poor Lane-Miles	2019 Sub-Total
Class 1	17,659 (65.1%)	9,138 (33.7%)	349 (1.3%)	27,145 (100%)	17,801 (66.2%)	8,781 (32.6%)	314 (1.2%)	26,895 (100%)
Class 2	7,543 (46.0%)	8,720 (53.2%)	140 (0.9%)	16,403 (100%)	7,509 (46.8%)	8,409 (52.4%)	138 (0.9%)	16,056 (100%)
Class 3	2,854 (42.5%)	3,786 (56.4%)	72 (1.1%)	6,713 (100%)	3,002 (44.7%)	3,654 (54.4%)	64 (1.0%)	6,720 (100%)
Statewide Total	28,056 (55.8%)	21,644 (43.1%)	560 (1.1%)	50,261 (100%)	28,312 (57.0%)	20,844 (42.0%)	516 (1.0%)	49,672 (100%)

TABLE 2. STATEWIDE PAVEMENT CONDITION SUMMARY BY ROADWAY CLASSIFICATION, BASED ON CALTRANS RATING SYSTEM

Roadway Class	2018 Green Lane-Miles	2018 Yellow Lane-Miles	2018 Red Lane-Miles	2018 Sub-Total	2019 Green Lane-Miles	2019 Yellow Lane-Miles	2019 Red Lane-Miles	2019 Sub-Total
Class 1	22,319 (82.2%)	2,918 (10.7%)	1,909 (7.0%)	27,145 (100%)	22,204 (82.6%)	2,861 (10.6%)	1,831 (6.8%)	26,895 (100%)
Class 2	9,517 (58.0%)	4,120 (25.1%)	2,765 (16.9%)	16,403 (100%)	9,302 (57.9%)	4,053 (25.2%)	2,701 (16.8%)	16,056 (100%)
Class 3	3,540 (52.7%)	1,680 (25.0%)	1,492 (22.2%)	6,713 (100%)	3,634 (54.1%)	1,729 (25.7%)	1,358 (20.2%)	6,720 (100%)
Statewide Total	35,376 (70.4%)	8,718 (17.3%)	6,166 (12.3%)	50,261 (100%)	35,139 (70.7%)	8,643 (17.4%)	5,890 (11.9%)	49,672 (100%)

In 2019, approximately 64 percent of total lane-miles collected were measured with an International Roughness Index (I.R.I.) of less than 95 inches per mile, 28 percent with an I.R.I. between 95 to 170 inches per mile, and 8 percent with an I.R.I. greater than 170 inches per mile.

Caltrans is committed to using maintenance resources effectively to prolong the service life of the pavement and maintain the S.H.S. at the lowest possible long-term cost. The A.P.C.S. data also serves as a crucial component of Caltrans' Pavement Management System (PaveM). PaveM uses pavement condition data along with other information such as traffic census, climate region, and construction history to predict future pavement condition and recommend project locations viable for cost-effective treatments.

From Fiscal Year (F.Y.) 2018/19 through F.Y. 2019/20, Caltrans delivered over \$3.1 billion in pavement projects on nearly 5,300 lane-miles of roadway. Table 3 summarizes the total capital costs and lane-miles for Highway Maintenance (H.M.1) and State Highway Operations and Protection Program (S.H.O.P.P.) pavement projects within the last two fiscal years.

TABLE 3. AWARDED PAVEMENT IMPROVEMENTS CAPITAL COSTS AND LANE-MILES FROM F.Y. 2018/19 TO F.Y. 2019/20

Funding Program	F.Y. 2018/19 Million Dollar¹	F.Y. 2018/19 Lane- Miles	F.Y. 2019/20 Million Dollar¹	F.Y. 2019/20 Lane- Miles	Total Million Dollar¹	Total Lane- Miles
H.M.1	\$280	1,327	\$201	1,285	\$481	2,612
S.H.O.P.P. – C.A.P.M.	\$295	610	\$350	1,026	\$645	1,636
S.H.O.P.P. – Rehabilitation	\$985	524	\$1,038	497	\$2,023	1,021
S.H.O.P.P. – Minor A	\$3	3	\$3	7	\$6	10
S.H.O.P.P. – Sub-Total	\$1,283	1,137	\$1,391	1,530	\$2,674	2,667
Total H.M.1 & S.H.O.P.P.	\$1,563	2,464	\$1,592	2,815	\$3,155	5,278

¹ Costs associated to pavement-related contract bid items only and exclude project support costs. It also does not include on-call maintenance contracts or Director's Order contracts.

STATE HIGHWAY SYSTEM

The S.H.S. primarily consists of two types of pavement: asphalt and concrete. Asphalt pavements include pavement surfaced with conventional hot mix asphalt (either open-graded or dense-graded), rubberized hot mix asphalt (either open-graded or gap-graded), chip seal, slurry seal, bonded wearing course, or other asphaltic materials. Asphalt pavement surfaces also include composite pavements with underlying concrete pavement. Concrete pavements include pavement surfaced with concrete materials such as jointed plain concrete pavement (J.P.C.P.), continuously reinforced concrete pavement (C.R.C.P.), and precast concrete pavement.

Table 4 presents the statewide lane-miles of pavement, by type and excluding bridges and other structures, that were collected in the 2018 and 2019 A.P.C.S. cycles.

TABLE 4. STATEWIDE LANE-MILES OF A.P.C.S. DATA COLLECTED BY PAVEMENT TYPE

<u>Pavement Type</u>	<u>2018 Lane-Miles Collected</u>	<u>2019 Lane-Miles Collected</u>
Asphalt	37,122 (73.9%)	36,663 (73.8%)
Concrete	13,138 (26.1%)	13,009 (26.2%)
Statewide Total	50,261 (100%)	49,672 (100%)

The difference in the total lane-miles collected between 2018 and 2019 may be attributed to right-of-way relinquishments, new roadway pavement segments, new roadway re-alignments, or pavement locations where conditions could not be collected such as roadway closures for highway construction activities.

Table 5 presents the statewide lane-miles of pavement, by roadway classification, that were collected in the 2018 and 2019 A.P.C.S. cycles. For planning purposes, the S.H.S. has been classified into three roadway classifications:

- Roadway Class 1 contains route segments classified as Interstate and other principal arterials. It includes Freight Network Tier I and II, and the Strategic Highway Network (S.T.R.A.H.N.E.T.) routes. Examples of Class 1 routes are Sacramento-80, Alameda-580, Ventura-101, Los Angeles-210, and San Diego-8.
- Roadway Class 2 contains route segments classified as non-Interstate National Highway System and Interregional Road System (I.R.R.S.). It

includes Freight Network Tier 3. Examples of Class 2 routes are Mendocino-20, Napa-29, Monterey-1, Riverside-74, and Orange-73.

- Roadway Class 3 contains all other routes not included in Classes 1 and 2. Examples of Class 3 routes are Trinity-3, Humbolt-36, San Luis Obispo-58, and Mono-167.

TABLE 5. STATEWIDE LANE-MILES OF A.P.C.S. DATA COLLECTED BY ROADWAY CLASSIFICATION

<u>Roadway Class</u>	<u>2018 Lane-Miles Collected</u>	<u>2019 Lane-Miles Collected</u>
Class 1	27,145 (54.0%)	26,895 (54.1%)
Class 2	16,403 (32.6%)	16,056 (32.3%)
Class 3	6,713 (13.4%)	6,720 (13.5%)
Statewide Total	50,261 (100%)	49,672 (100%)

The S.H.S. includes the Interstate System, other roadways along the National Highway System (N.H.S.), and Non-N.H.S. roadways. Table 6 presents the statewide lane-miles of pavement, by highway type, that were collected in the 2018 and 2019 A.P.C.S. cycles.

TABLE 6. STATEWIDE LANE-MILES OF A.P.C.S. DATA COLLECTED BY HIGHWAY TYPE

<u>Highway Type</u>	<u>2018 Lane-Miles Collected</u>	<u>2019 Lane-Miles Collected</u>
N.H.S. – Interstate	14,411 (28.7%)	14,283 (28.8%)
N.H.S. – Non-Interstate	22,765 (45.3%)	22,417 (45.1%)
N.H.S. Sub-Total	37,176 (74.0%)	36,700 (73.9%)
Non-N.H.S.	13,085 (26.0%)	12,972 (26.1%)
Statewide Total	50,261 (100%)	49,672 (100%)

There are 12 Caltrans regional districts across California. Each district is responsible for managing and maintaining their respective portions of the S.H.S. network. Table 7 presents the statewide lane-miles of pavement, by district, that were collected in the 2018 and 2019 A.P.C.S. cycles.

TABLE 7. STATEWIDE LANE-MILES OF A.P.C.S. DATA COLLECTED BY DISTRICT

District	2018 Lane-Miles Collected	2019 Lane-Miles Collected
District 1	2,326 (4.6%)	2,323 (4.7%)
District 2	3,970 (7.9%)	3,953 (8.0%)
District 3	4,439 (8.8%)	4,403 (8.9%)
District 4	6,184 (12.3%)	6,051 (12.2%)
District 5	3,175 (6.3%)	3,150 (6.3%)
District 6	5,095 (10.1%)	4,995 (10.1%)
District 7	6,255 (12.4%)	6,029 (12.1%)
District 8	6,663 (13.3%)	6,600 (13.3%)
District 9	2,563 (5.1%)	2,548 (5.1%)
District 10	3,520 (7.0%)	3,498 (7.0%)
District 11	4,097 (8.2%)	4,162 (8.4%)
District 12	1,976 (3.9%)	1,960 (3.9%)
Statewide Total	50,261 (100%)	49,672 (100%)

A map of each Caltrans district's boundary is available in Appendix A.

PAVEMENT CONDITION MONITORING AND MANAGEMENT

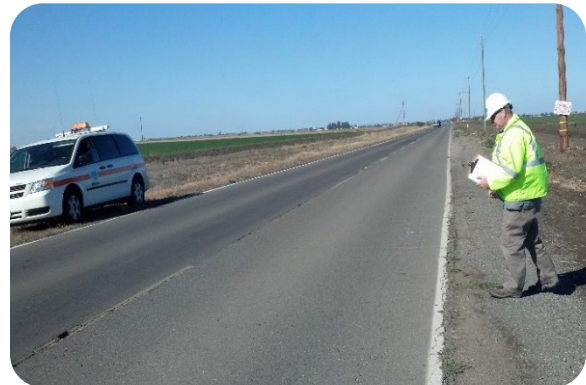
Pavement Condition Monitoring

Historically, a team of pavement raters would conduct a manual pavement condition survey at various locations along the S.H.S. once a year. The pavement raters visually inspected the outside highway lanes for both directions of travel using systematic sampling techniques. Pavement condition assessments would be extrapolated for the entire S.H.S. based on those sample locations.

Between 2011 and 2012, Caltrans began testing and transitioning to A.P.C.S. to efficiently collect, evaluate, and analyze pavement condition for all lanes on the S.H.S. It utilizes vehicles equipped with an array of on-board high-definition cameras, laser sensors, Global Positioning System tracker, and other measurement devices that quickly collect pavement data at highway speeds. The data collected includes geographical locations of the highways, downward-looking pavement surface images, forward right-of-way images, and pavement surface profiles. For asphalt pavement and C.R.C.P., one data element is reported for every 26.4-foot section. For J.P.C.P., one data element is reported for each concrete slab. The data elements would be aggregated to calculate a weighted average of the pavement condition for each 0.1-mile segment.

Figure 1 presents the data collection methods for A.P.C.S. and manual inspection. The manual pavement inspection is now a component of the A.P.C.S. data validation process in compliance with 23 C.F.R. 490.319(c).

FIGURE 1. A.P.C.S. VEHICLE ON THE ROAD AND MANUAL PAVEMENT INSPECTION



Pavement Management System

The Pavement Management System (PaveM) is a versatile tool that assists Caltrans with analyzing existing pavement condition, predicting future pavement condition, and recommending pavement projects to achieve

targeted performance goals by data driven strategies. PaveM uses many data inputs such as pavement condition, traffic census, climate region, pavement treatments, and construction history to predict future pavement condition and recommend projects. The tool maximizes funding resources by assisting with analysis of network-wide investment alternatives.

FEDERAL PAVEMENT PERFORMANCE MEASURES

The Moving Ahead for Progress in the 21st Century Act (M.A.P.-21) established a performance-based objective that directs States to make smart transportation investment decisions and work toward achieving seven national performance goals. One of the national goals is pavement performance. The National Highway Performance Program (N.H.P.P.) was enacted under M.A.P.-21 and continued under the Fixing America's Surface Transportation Act (F.A.S.T. Act) to provide guidance for States to meet the national goals. In accordance with the N.H.P.P., the federal pavement performance measures are codified under 23 C.F.R. 490, Subpart C.

The N.H.P.P. determines pavement performance measures based on a combination of different pavement distress metrics. Asphalt pavement metrics are surface roughness according to I.R.I., cracking, and rutting. J.P.C.P. pavement metrics are I.R.I., cracking, and faulting. C.R.C.P. pavement metrics are I.R.I. and cracking. The metrics are rated as *Good*, *Fair*, and *Poor* based on a set of criteria for each pavement type. Table 8 presents the performance metrics and measures criteria for each pavement type. *Good* pavement measure is represented as green, *Fair* pavement measure is represented as light purple, and *Poor* pavement measure is represented as purple.

TABLE 8. FEDERAL PAVEMENT PERFORMANCE METRICS AND MEASURES CRITERIA

<u>Performance Metrics</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>
I.R.I. (inches per mile)	Less than 95	Between 95 to 170	Greater than 170
Cracking (percentage) for Asphalt Pavement	Less than 5	Between 5 to 20	Greater than 20
Cracking (percentage) for J.P.C.P.	Less than 5	Between 5 to 15	Greater than 15
Cracking (percentage) for C.R.C.P.	Less than 5	Between 5 to 10	Greater than 10
Rutting (inch) for Asphalt Pavement	Less than 0.2	Between 0.2 to 0.4	Greater than 0.4
Faulting (inch) for J.P.C.P.	Less than 0.10	Between 0.10 to 0.15	Greater than 0.15

The overall condition of a pavement section will be considered *Good* if all the performance metrics for each pavement type are rated as *Good*. If two or more performance metrics are rated as *Poor*, then the pavement section is considered *Poor*. All other condition combinations are considered as *Fair*.

Table 9 presents the statewide pavement performance targets established by Caltrans for each roadway classification and performance measure.

TABLE 9. STATEWIDE PAVEMENT PERFORMANCE TARGETS FOR EACH ROADWAY CLASSIFICATION AND FEDERAL PERFORMANCE MEASURE

<u>Roadway Class</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>
Class 1	60%	39%	1%
Class 2	55%	43%	2%
Class 3	45%	53%	2%

Pavement Condition Statewide

Overall Pavement Condition

Table 10 presents the 2018 and 2019 statewide pavement condition based on the federal performance measures. The percentage of *Good* pavement increased, and the percentage of *Fair* and *Poor* pavement decreased in 2019 compared to 2018.

TABLE 10. STATEWIDE PAVEMENT CONDITION SUMMARY BASED ON FEDERAL PERFORMANCE MEASURES

<u>Federal Measure</u>	<u>2018 Lane-Miles</u>	<u>2019 Lane-Miles</u>
Good	28,056 (55.8%)	28,312 (57.0%)
Fair	21,644 (43.1%)	20,844 (42.0%)
Poor	560 (1.1%)	516 (1.0%)
Statewide Total	50,261 (100%)	49,672 (100%)

Condition by Pavement Type

Table 11 presents the 2018 and 2019 statewide pavement condition by pavement type, based on the federal performance measures. For asphalt pavement, the percentage of *Good* pavement increased, the percentage of *Fair* pavement decreased, and the percentage of *Poor* pavement remained relatively the same in 2019 compared to 2018. For concrete pavement, the percentage of *Good* pavement increased, and the percentage of *Fair* and *Poor* pavement decreased in 2019 compared to 2018.

**TABLE 11. STATEWIDE PAVEMENT CONDITION SUMMARY BY PAVEMENT TYPE,
BASED ON FEDERAL PERFORMANCE MEASURES**

<u>Federal Measure</u>	<u>2018 Asphalt Lane-Miles</u>	<u>2019 Asphalt Lane-Miles</u>	<u>2018 Concrete Lane-Miles</u>	<u>2019 Concrete Lane-Miles</u>
Good	21,399 (57.6%)	21,367 (58.3%)	6,657 (50.7%)	6,945 (53.4%)
Fair	15,518 (41.8%)	15,093 (41.2%)	6,126 (46.6%)	5,750 (44.2%)
Poor	205 (0.6%)	203 (0.6%)	356 (2.7%)	314 (2.4%)
Statewide Total	37,122 (100%)	36,663 (100%)	13,138 (100%)	13,009 (100%)

Condition by Roadway Class

Table 12 presents the 2018 and 2019 statewide pavement condition by roadway classification, based on the federal performance measures. The percentage of Good pavement increased for all three roadway classes in 2019 compared to 2018. The percentage of Fair pavement decreased for all three roadway classes. The percentage of Poor pavement decreased for Class 1 and Class 3, and it remained relatively the same for Class 2.

**TABLE 12. STATEWIDE PAVEMENT CONDITION SUMMARY BY ROADWAY
CLASSIFICATION, BASED ON FEDERAL PERFORMANCE MEASURES**

<u>Roadway Class</u>	<u>2018 Good Lane- Miles</u>	<u>2018 Fair Lane- Miles</u>	<u>2018 Poor Lane- Miles</u>	<u>2018 Sub- Total</u>	<u>2019 Good Lane- Miles</u>	<u>2019 Fair Lane- Miles</u>	<u>2019 Poor Lane- Miles</u>	<u>2019 Sub- Total</u>
Class 1	17,659 (65.1%)	9,138 (33.7%)	349 (1.3%)	27,145 (100%)	17,801 (66.2%)	8,781 (32.6%)	314 (1.2%)	26,895 (100%)
Class 2	7,543 (46.0%)	8,720 (53.2%)	140 (0.9%)	16,403 (100%)	7,509 (46.8%)	8,409 (52.4%)	138 (0.9%)	16,056 (100%)
Class 3	2,854 (42.5%)	3,786 (56.4%)	72 (1.1%)	6,713 (100%)	3,002 (44.7%)	3,654 (54.4%)	64 (1.0%)	6,720 (100%)
Statewide Total	28,056 (55.8%)	21,644 (43.1%)	560 (1.1%)	50,261 (100%)	28,312 (57.0%)	20,844 (42.0%)	516 (1.0%)	49,672 (100%)

Pavement condition for each district by roadway classification, based on the federal performance measures is available in Appendix B and Appendix C.

Condition by Highway Type

Table 13 presents the 2018 and 2019 statewide pavement condition by highway type, based on the federal performance measures. The percentage of Good pavement increased, and the percentage of Fair pavement decreased for all highway types in 2019 compared to 2018. While the percentage of Poor pavement decreased for the N.H.S., it increased slightly for the Non-N.H.S. in 2019.

TABLE 13. STATEWIDE PAVEMENT CONDITION SUMMARY BY HIGHWAY TYPE, BASED ON FEDERAL PERFORMANCE MEASURES

<u>Highway Type</u>	<u>2018 Good Lane- Miles</u>	<u>2018 Fair Lane- Miles</u>	<u>2018 Poor Lane- Miles</u>	<u>2018 Sub- Total</u>	<u>2019 Good Lane- Miles</u>	<u>2019 Fair Lane- Miles</u>	<u>2019 Poor Lane- Miles</u>	<u>2019 Sub- Total</u>
N.H.S. – Interstate	9,325 (64.7%)	4,888 (33.9%)	198 (1.4%)	14,411 (100%)	9,428 (66.0%)	4,676 (32.7%)	179 (1.3%)	14,283 (100%)
N.H.S. – Non-Interstate	12,972 (57.0%)	9,539 (41.9%)	254 (1.1%)	22,765 (100%)	13,041 (58.2%)	9,158 (40.9%)	217 (1.0%)	22,417 (100%)
N.H.S. – Sub-Total	22,298 (60.0%)	14,426 (38.8%)	452 (1.2%)	37,176 (100%)	22,470 (61.2%)	13,834 (37.7%)	397 (1.1%)	36,700 (100%)
Non-N.H.S.	5,758 (44.0%)	7,218 (55.2%)	109 (0.8%)	13,085 (100%)	5,843 (45.0%)	7,010 (54.0%)	120 (0.9%)	12,972 (100%)
Statewide Total	28,056 (55.8%)	21,644 (43.1%)	560 (1.1%)	50,261 (100%)	28,312 (57.0%)	20,844 (42.0%)	516 (1.0%)	49,672 (100%)

Pavement Condition by District

Table 14 presents the 2018 and 2019 statewide pavement condition by district, based on the federal performance measures. The percentage of Good pavement increased for all districts except for District 2, District 3, District 9, and District 10 in 2019 compared to 2018. The percentage of Fair pavement also decreased for all districts except for District 2, District 3, District 9, and District 10. The percentage of Poor pavement decreased for District 1, District 2, District 5, District 7, District 9, District 10, and District 11.

**TABLE 14. STATEWIDE PAVEMENT CONDITION SUMMARY BY DISTRICT, BASED ON
FEDERAL PERFORMANCE MEASURES**

District	2018 Good Lane- Miles	2018 Fair Lane- Miles	2018 Poor Lane- Miles	2018 Sub- Total	2019 Good Lane- Miles	2019 Fair Lane- Miles	2019 Poor Lane- Miles	2019 Sub- Total
District 1	1,125 (48.4%)	1,188 (51.1%)	13 (0.5%)	2,326 (100%)	1,129 (48.6%)	1,185 (51.0%)	9 (0.4%)	2,323 (100%)
District 2	2,368 (59.7%)	1,562 (39.3%)	39 (1.0%)	3,970 (100%)	2,274 (57.5%)	1,656 (41.9%)	23 (0.6%)	3,953 (100%)
District 3	2,604 (58.7%)	1,802 (40.6%)	32 (0.7%)	4,439 (100%)	2,418 (54.9%)	1,940 (44.1%)	45 (1.0%)	4,403 (100%)
District 4	2,693 (43.5%)	3,390 (54.8%)	101 (1.6%)	6,184 (100%)	2,871 (47.4%)	3,069 (50.7%)	111 (1.8%)	6,051 (100%)
District 5	1,714 (54.0%)	1,428 (45.0%)	33 (1.0%)	3,175 (100%)	1,746 (55.4%)	1,381 (43.8%)	24 (0.7%)	3,150 (100%)
District 6	3,274 (64.3%)	1,779 (34.9%)	41 (0.8%)	5,095 (100%)	3,332 (66.7%)	1,617 (32.4%)	45 (0.9%)	4,995 (100%)
District 7	2,648 (42.3%)	3,463 (55.4%)	143 (2.3%)	6,255 (100%)	2,879 (47.7%)	3,048 (50.6%)	102 (1.7%)	6,029 (100%)
District 8	3,759 (56.4%)	2,798 (42.0%)	106 (1.6%)	6,663 (100%)	3,875 (58.7%)	2,615 (39.6%)	110 (1.7%)	6,600 (100%)
District 9	2,065 (80.6%)	494 (19.3%)	4 (0.2%)	2,563 (100%)	1,939 (76.1%)	605 (23.7%)	4 (0.1%)	2,548 (100%)
District 10	2,361 (67.1%)	1,128 (32.1%)	31 (0.9%)	3,520 (100%)	2,268 (64.8%)	1,205 (34.5%)	25 (0.7%)	3,498 (100%)
District 11	2,452 (59.8%)	1,635 (39.9%)	10 (0.3%)	4,097 (100%)	2,564 (61.6%)	1,588 (38.1%)	10 (0.2%)	4,162 (100%)
District 12	994 (50.3%)	975 (49.4%)	7 (0.4%)	1,976 (100%)	1,017 (51.9%)	935 (47.7%)	8 (0.4%)	1,960 (100%)
Statewide Total	28,056 (55.8%)	21,644 (43.1%)	560 (1.1%)	50,261 (100%)	28,312 (57.0%)	20,844 (42.0%)	516 (1.0%)	49,672 (100%)

CALTRANS PAVEMENT RATING SYSTEM

The Caltrans pavement rating system utilizes a different methodology than the federal measures to integrate conditions with engineering solutions. The Caltrans pavement rating system designates the color *Green* for pavement with no distress or very low distress, the color *Yellow* for pavement with minor cracking or surface distress, and the color *Red* for distressed pavement that has structural distress or poor ride quality. This is referred to as the R.Y.G. (Red, Yellow, and Green) designation.

Preventive treatments would typically be applied to the *Green* pavement to maintain and prolong its good condition. *Yellow* pavement would receive corrective treatments to slow pavement deterioration. *Red* distressed pavement would need more substantial rehabilitation treatments to bring it to a state of good repair or complete reconstruction and replacement.

To determine the appropriate treatments for the distressed pavement, the *Red* pavement is further subdivided into the color *Blue* for pavement with poor ride quality, the color *Orange* for pavement with minor structural distress, and the color *Red* for pavement with major structural distress. Along with the prior *Green* and *Yellow* pavements, this is referred to as the R.O.B.Y.G. (Red, Orange, Blue, Yellow, and Green) designation. Figure 2 presents examples of the pavement condition for each category of the R.O.B.Y.G. designation.

FIGURE 2. EXAMPLES OF PAVEMENT CONDITION BASED ON CALTRANS RATING SYSTEM

Green

Yellow



No Distress

Minor Surface Distress

Blue

Orange

Red



Poor Ride Only

Minor Structural Distress

Major Structural Distress

Table 15 presents the Caltrans pavement condition rating priority matrix for asphalt pavement. Figure 3 presents examples of distress for asphalt pavement.

TABLE 15. CALTRANS CONDITION RATING PRIORITY MATRIX FOR ASPHALT PAVEMENT

<u>Alligator B Cracking (percentage) Rating Criteria</u>	<u>Alligator A Plus Alligator B Cracking (percentage) Rating Criteria</u>	<u>I.R.I. (inches per mile) Rating Criteria</u>	<u>R.Y.G. Rating</u>	<u>R.O.B.Y.G. Rating</u>	<u>Condition Rating</u>
Less than 5%	Less than 5%	Less than or equal to 170	Green	Green	Low I.R.I., Very Low B Cracking, Very Low A Cracking
Less than 5%	Greater than or equal to 5%	Less than or equal to 170	Yellow	Yellow	A Plus B Cracking
Greater than or equal to 5%, and less than 10%	Any value	Less than or equal to 170	Yellow	Yellow	Low B Cracking
Less than 5%	Any value	Greater than 170	Red	Blue	High I.R.I. Only
Greater than or equal to 5%, and less than 10%	Any value	Greater than 170	Red	Blue	High I.R.I., Low B Cracking
Between 10% and 30%	Any value	Any value	Red	Orange	Medium B Cracking
Greater than 30%	Any value	Any value	Red	Red	High B Cracking

FIGURE 3. EXAMPLES OF DISTRESS FOR ASPHALT PAVEMENT



Table 16 presents the Caltrans pavement condition rating priority matrix for jointed plain concrete pavement. Figure 4 presents examples of distress for concrete pavement.

TABLE 16. CALTRANS CONDITION RATING PRIORITY MATRIX FOR JOINTED PLAIN CONCRETE PAVEMENT

<u>3rd Stage Cracking (Percentage) Rating Criteria</u>	<u>Faulting² (Percentage) Rating Criteria</u>	<u>I.R.I. (inches per mile) Rating Criteria</u>	<u>R.Y.G. Rating</u>	<u>R.O.B.Y.G. Rating</u>	<u>Condition Rating</u>
Less than 3%	Less than or equal to 25%	Less than or equal to 170	Green	Green	Low I.R.I., Low Cracking, Low Faulting
Between 3% and 10%	Less than or equal to 25%	Less than or equal to 170	Yellow	Yellow	Medium Cracking Only
Less than 3%	Less than or equal to 25%	Greater than 170	Red	Blue	High I.R.I. Only
Between 3% and 10%	Less than or equal to 25%	Greater than 170	Red	Blue	High I.R.I., Medium Cracking, Low Faulting
Less than 3%	Greater than 25%	Any value	Red	Orange	High Faulting, Low Cracking
Between 3% and 10%	Greater than 25%	Any value	Red	Orange	High Faulting, Medium Cracking
Greater than 10%	Any value	Any value	Red	Red	High Cracking

² Faulting percentage is the percentage of data elements in a segment with fault height greater than 0.15 inch.

FIGURE 4. EXAMPLES OF DISTRESS FOR CONCRETE PAVEMENT



Pavement Condition Statewide

Overall Pavement Condition

Table 17 presents the 2018 and 2019 statewide pavement condition based on the Caltrans rating system. The percentage of *Green* pavement increased, the percentage of *Yellow* pavement increased, and the percentage *Red* pavement decreased in 2019 compared to 2018.

TABLE 17. STATEWIDE PAVEMENT CONDITION SUMMARY BASED ON CALTRANS RATING SYSTEM

Caltrans Rating System	2018 Lane-miles	2019 Lane-miles
Green	35,376 (70.4%)	35,139 (70.7%)
Yellow	8,718 (17.3%)	8,643 (17.4%)
Red	6,166 (12.3%)	5,890 (11.9%)
Statewide Total	50,261 (100%)	49,672 (100%)

Condition by Pavement Type

Table 18 presents the 2018 and 2019 statewide pavement condition by pavement type, based on the Caltrans rating system. For asphalt pavement, the percentage of *Green* pavement remained relatively the same, the percentage of *Yellow* pavement increased, and the percentage of *Red* pavement decreased in 2019 compared to 2018. For concrete pavement, the percentage of *Green* pavement increased, and the percentage of *Yellow* and *Red* pavement decreased in 2019 compared to 2018.

TABLE 18. STATEWIDE PAVEMENT CONDITION SUMMARY BY PAVEMENT TYPE, BASED ON CALTRANS RATING SYSTEM

<u>Caltrans Rating System</u>	<u>2018 Asphalt Lane-Miles</u>	<u>2019 Asphalt Lane-Miles</u>	<u>2018 Concrete Lane-Miles</u>	<u>2019 Concrete Lane-Miles</u>
Green	24,338 (65.6%)	24,036 (65.6%)	11,038 (84.0%)	11,103 (85.3%)
Yellow	8,108 (21.8%)	8,082 (22.0%)	610 (4.6%)	561 (4.3%)
Red	4,676 (12.6%)	4,545 (12.4%)	1,490 (11.3%)	1,345 (10.3%)
Statewide Total	37,122 (100%)	36,663 (100%)	13,138 (100%)	13,009 (100%)

Pavement Condition by Roadway Class

Table 19 presents the 2018 and 2019 statewide pavement condition by roadway classification, based on the Caltrans rating system. The percentage of *Green* pavement increased for Class 1 and Class 3 in 2019 compared to 2018, and it decreased for Class 2. The percentage of *Yellow* pavement decreased for Class 1, and it increased for Class 2 and Class 3. The percentage of *Red* pavement decreased for all three roadway classes.

TABLE 19. STATEWIDE PAVEMENT CONDITION SUMMARY BY ROADWAY CLASSIFICATION, BASED ON CALTRANS RATING SYSTEM

<u>Roadway Class</u>	<u>2018 Green Lane-Miles</u>	<u>2018 Yellow Lane-Miles</u>	<u>2018 Red Lane-Miles</u>	<u>2018 Sub-Total</u>	<u>2019 Green Lane-Miles</u>	<u>2019 Yellow Lane-Miles</u>	<u>2019 Red Lane-Miles</u>	<u>2019 Sub-Total</u>
Class 1	22,319 (82.2%)	2,918 (10.7%)	1,909 (7.0%)	27,145 (100%)	22,204 (82.6%)	2,861 (10.6%)	1,831 (6.8%)	26,895 (100%)
Class 2	9,517 (58.0%)	4,120 (25.1%)	2,765 (16.9%)	16,403 (100%)	9,302 (57.9%)	4,053 (25.2%)	2,701 (16.8%)	16,056 (100%)
Class 3	3,540 (52.7%)	1,680 (25.0%)	1,492 (22.2%)	6,713 (100%)	3,634 (54.1%)	1,729 (25.7%)	1,358 (20.2%)	6,720 (100%)
Statewide Total	35,376 (70.4%)	8,718 (17.3%)	6,166 (12.3%)	50,261 (100%)	35,139 (70.7%)	8,643 (17.4%)	5,890 (11.9%)	49,672 (100%)

Pavement condition for each district by roadway class, based on the Caltrans rating system is available in Appendix D and Appendix E.

Pavement Condition by Highway Type

Table 20 presents the 2018 and 2019 statewide pavement by highway type, based on the Caltrans rating system. The percentage of *Green* pavement decreased for the N.H.S. Interstate, and it increased for the N.H.S. Non-Interstate in 2019 compared to 2018. The percentage of *Green* pavement increased for the entire N.H.S. as a combined category, and it decreased for the Non-N.H.S. The percentage of *Yellow* pavement increased for the N.H.S. Interstate, and it decreased for the N.H.S. Non-Interstate. The percentage of *Yellow* pavement decreased for the entire N.H.S. as a combined category, and it increased for the Non-N.H.S. The percentage of *Red* pavement decreased for all highway types in 2019 compared to 2018.

TABLE 20. STATEWIDE PAVEMENT CONDITION SUMMARY BY HIGHWAY TYPE, BASED ON CALTRANS RATING SYSTEM

<u>Highway Type</u>	<u>2018 Green Lane-Miles</u>	<u>2018 Yellow Lane-Miles</u>	<u>2018 Red Lane-Miles</u>	<u>2018 Sub-Total</u>	<u>2019 Green Lane-Miles</u>	<u>2019 Yellow Lane-Miles</u>	<u>2019 Red Lane-Miles</u>	<u>2019 Sub-Total</u>
N.H.S – Interstate	12,177 (84.5%)	1,274 (8.8%)	960 (6.7%)	14,411 (100%)	11,979 (83.9%)	1,356 (9.5%)	948 (6.6%)	14,283 (100%)
N.H.S. – Non-Interstate	15,827 (69.5%)	4,249 (18.7%)	2,690 (11.8%)	22,765 (100%)	15,998 (71.4%)	3,893 (17.4%)	2,526 (11.3%)	22,417 (100%)
N.H.S. Sub-Total	28,004 (75.3%)	5,523 (14.9%)	3,649 (9.8%)	37,176 (100%)	27,977 (76.2%)	5,249 (14.3%)	3,474 (9.5%)	36,700 (100%)
Non-N.H.S.	7,373 (56.3%)	3,195 (24.4%)	2,517 (19.2%)	13,085 (100%)	7,162 (55.2%)	3,394 (26.2%)	2,417 (18.6%)	12,972 (100%)
Statewide Total	35,376 (70.4%)	8,718 (17.3%)	6,166 (12.3%)	50,261 (100%)	35,139 (70.7%)	8,643 (17.4%)	5,890 (11.9%)	49,672 (100%)

Pavement Condition by District

Table 21 presents the 2018 and 2019 statewide pavement condition by district, based on the Caltrans rating system. The percentage of Green pavement increased for District 1, District 2, District 5, District 6, District 7, and District 9 in 2019 compared to 2018. The percentage of Green pavement decreased for District 3, District 4, District 8, District 10, District 11, and District 12. The percentage of Yellow pavement decreased for District 2, District 3, District 4, District 5, District 7, and District 9. The percentage of Yellow pavement increased for District 1, District 6, District 8, District 11, and District 12, and it remained relatively the same for District 10. The percentage of Red pavement decreased for District 1, District 2, District 5, District 6, District 7, District 9, and District 11. The percentage of Red pavement increased for District 3, District 4, District 8, District 10, and District 12.

TABLE 21. STATEWIDE PAVEMENT CONDITION SUMMARY BY DISTRICT, BASED ON CALTRANS RATING SYSTEM

<u>District</u>	<u>2018 Green Lane- Miles</u>	<u>2018 Yellow Lane- Miles</u>	<u>2018 Red Lane- Miles</u>	<u>2018 Sub- Total</u>	<u>2019 Green Lane- Miles</u>	<u>2019 Yellow Lane- Miles</u>	<u>2019 Red Lane- Miles</u>	<u>2019 Sub- Total</u>
District 1	1,514 (65.1%)	365 (15.7%)	447 (19.2%)	2,326 (100%)	1,546 (66.5%)	412 (17.7%)	366 (15.8%)	2,323 (100%)
District 2	2,310 (58.2%)	1,278 (32.2%)	381 (9.6%)	3,970 (100%)	2,383 (60.3%)	1,207 (30.5%)	363 (9.2%)	3,953 (100%)
District 3	3,117 (70.2%)	884 (19.9%)	438 (9.9%)	4,439 (100%)	3,064 (69.6%)	751 (17.1%)	588 (13.4%)	4,403 (100%)
District 4	4,421 (71.5%)	647 (10.5%)	1,116 (18.1%)	6,184 (100%)	4,260 (70.4%)	630 (10.4%)	1,161 (19.2%)	6,051 (100%)
District 5	1,862 (58.7%)	745 (23.5%)	568 (17.9%)	3,175 (100%)	1,904 (60.4%)	724 (23.0%)	522 (16.6%)	3,150 (100%)
District 6	3,538 (69.5%)	967 (19.0%)	589 (11.6%)	5,095 (100%)	3,543 (70.9%)	976 (19.5%)	476 (9.5%)	4,995 (100%)
District 7	4,514 (72.2%)	666 (10.6%)	1,075 (17.2%)	6,255 (100%)	4,669 (77.5%)	525 (8.7%)	834 (13.8%)	6,029 (100%)
District 8	4,771 (71.6%)	1,132 (17.0%)	759 (11.4%)	6,663 (100%)	4,397 (66.6%)	1,423 (21.6%)	780 (11.8%)	6,600 (100%)
District 9	1,789 (69.8%)	658 (25.7%)	116 (4.5%)	2,563 (100%)	1,935 (75.9%)	522 (20.5%)	91 (3.6%)	2,548 (100%)
District 10	2,479 (70.4%)	738 (21.0%)	302 (8.6%)	3,520 (100%)	2,432 (69.5%)	734 (21.0%)	332 (9.5%)	3,498 (100%)
District 11	3,385 (82.6%)	475 (11.6%)	238 (5.8%)	4,097 (100%)	3,381 (81.2%)	563 (13.5%)	218 (5.2%)	4,162 (100%)
District 12	1,676 (84.8%)	163 (8.2%)	138 (7.0%)	1,976 (100%)	1,626 (83.0%)	175 (8.9%)	159 (8.1%)	1,960 (100%)
Statewide Total	35,376 (70.4%)	8,718 (17.3%)	6,166 (12.3%)	50,261 (100%)	35,139 (70.7%)	8,643 (17.4%)	5,890 (11.9%)	49,672 (100%)

PAVEMENT ROUGHNESS

Pavement Roughness Statewide

Pavement roughness correlates surface ride quality to the level of comfort that people experience while traveling along the roadway. Both the Federal Highway Administration (F.H.W.A.) and Caltrans included I.R.I. as a pavement performance criterion. It is undesirable for I.R.I. to exceed 170 inches per mile.

Figure 5 presents the 2018 and 2019 statewide I.R.I. distribution percentage. Green represents pavement with I.R.I. less than 95 inches per mile, yellow represents pavement with I.R.I. between 95 to 170 inches per mile, and blue represents pavement with I.R.I. greater than 170 inches per mile. Overall, there was less pavement with I.R.I. greater than 170 inches per mile in 2019 compared to 2018.

FIGURE 5. STATEWIDE I.R.I. DISTRIBUTION PERCENTAGE

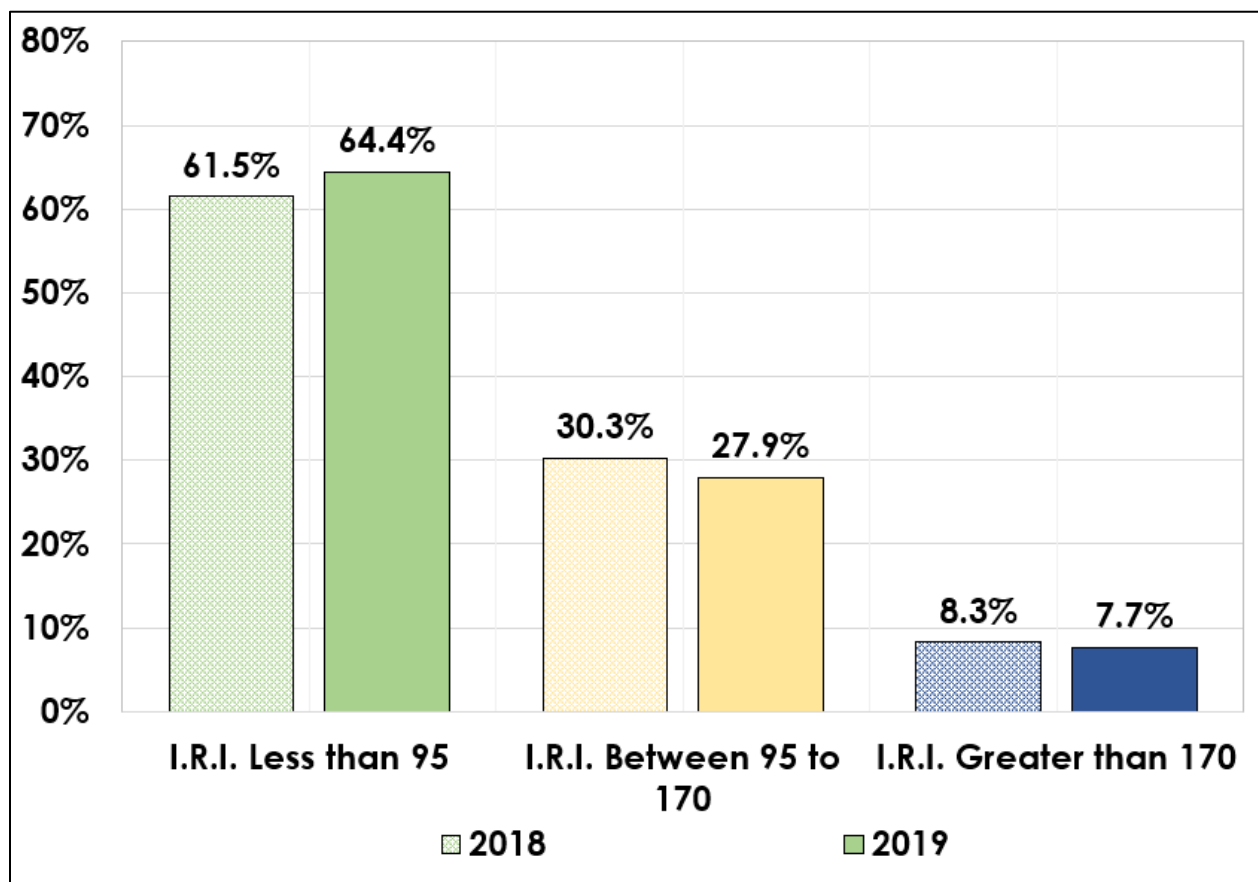
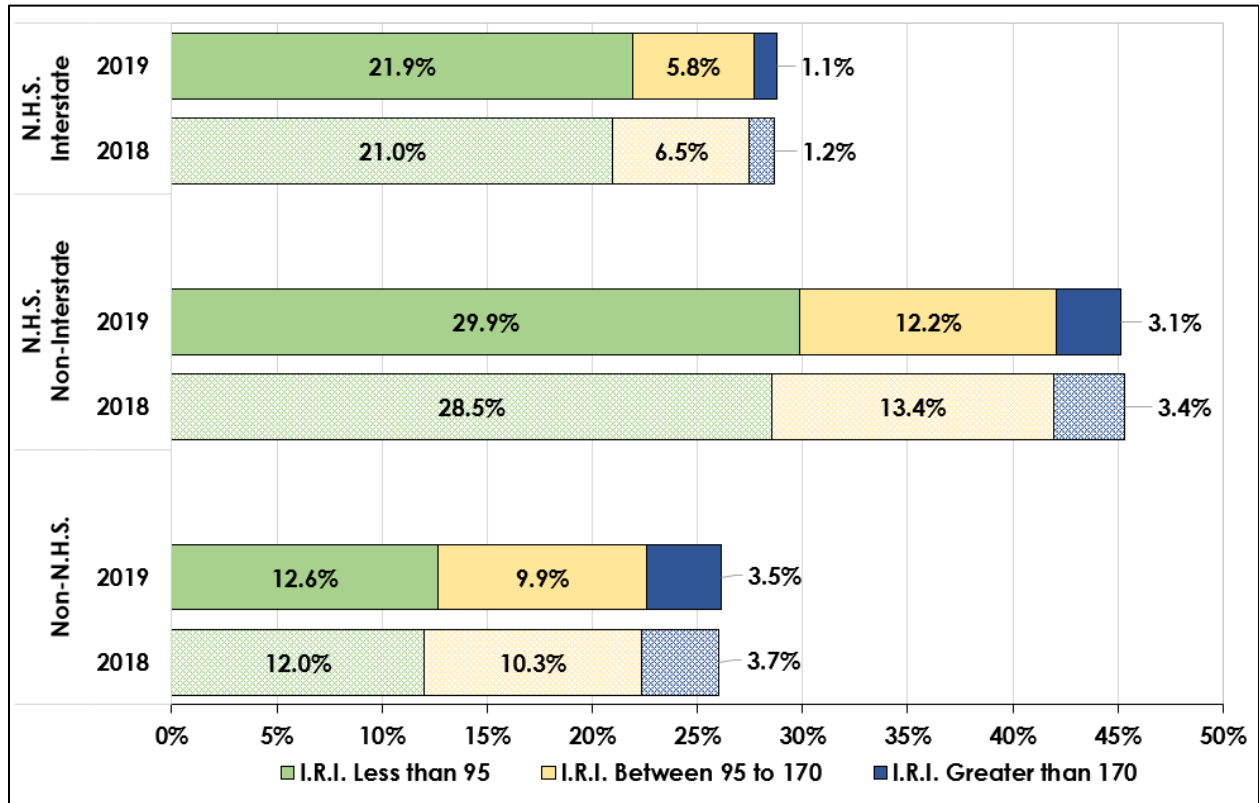


Figure 6 presents the 2018 and 2019 statewide I.R.I. distribution percentage by highway type. The percentage of pavement lane-miles with I.R.I. less than 95

inches per mile increased for all highway types in 2019 compared to 2018. The percentage of I.R.I. between 95 to 170 inches per mile and the undesirable I.R.I. greater than 170 inches per mile decreased for all highway types.

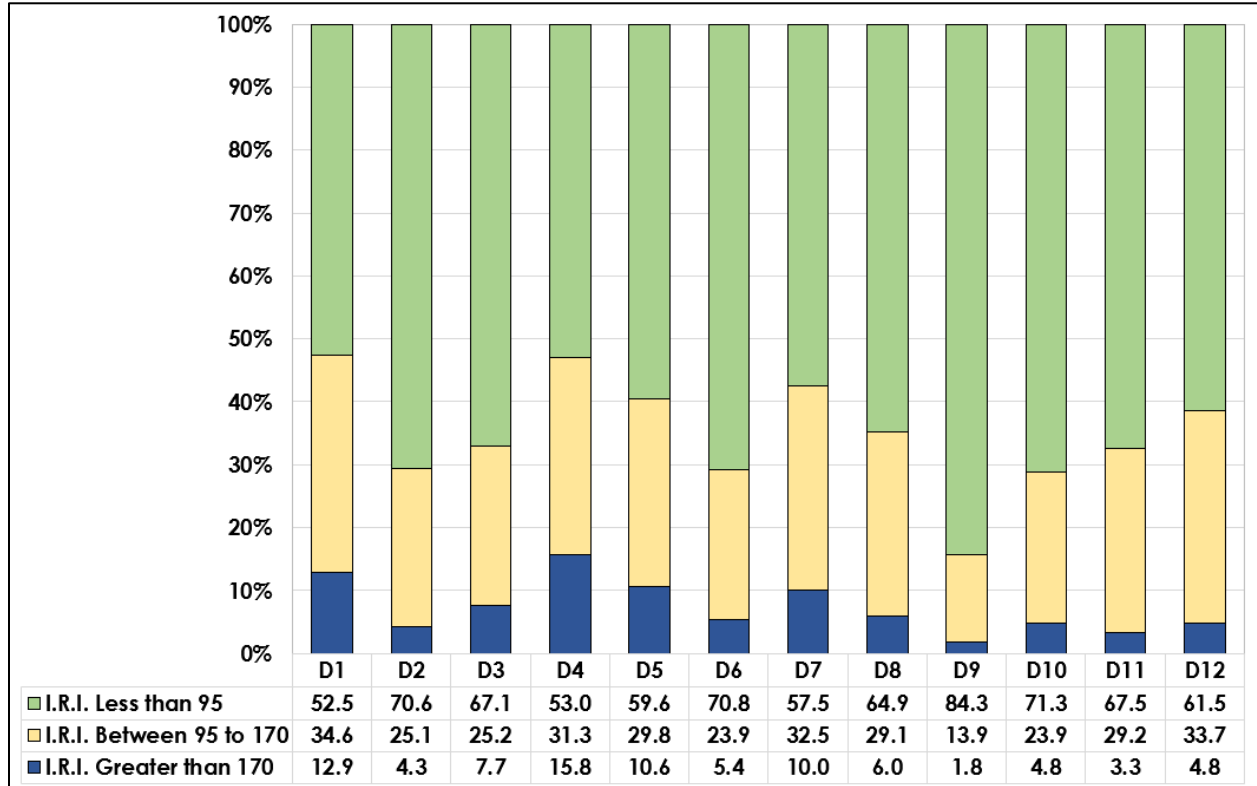
FIGURE 6. STATEWIDE I.R.I. DISTRIBUTION PERCENTAGE BY HIGHWAY TYPE



Pavement Roughness by District

Figure 7 presents the 2019 statewide I.R.I. distribution percentage by district.

FIGURE 7. 2019 STATEWIDE I.R.I. DISTRIBUTION PERCENTAGE BY DISTRICT

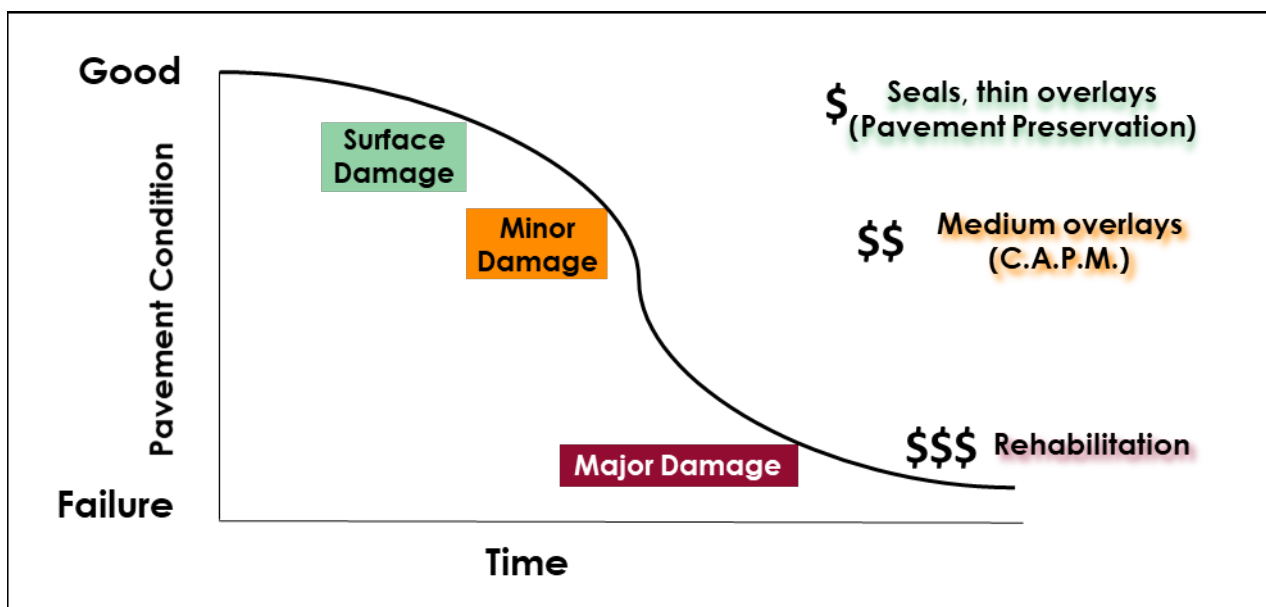


I.R.I. distribution for each district by highway type is available in Appendix F and Appendix G.

PAVEMENT TREATMENT STRATEGIES

Pavement deterioration can be represented graphically by a sigmoid curve where the rate will be slow initially before exponentially accelerating until the pavement reaches failure. By applying timely preventive treatments, Caltrans can extend the service life of the pavement and delay the need to apply more costly treatments in the future. For example, pavement preventive maintenance costs an average of \$184,000 per lane-mile, while major pavement rehabilitation could cost up to ten times higher. Figure 8 presents a typical pavement deterioration curve and the potential management strategies for each phase of the pavement's service life.

FIGURE 8. ILLUSTRATION OF COST EFFECTIVENESS OF PAVEMENT STRATEGIES



Pavement naturally deteriorates over time. Locations in relatively good condition may still be candidates for preventive and corrective treatments to maintain the pavement at a state of good repair. Studies have shown that preventive and corrective maintenance treatments can extend pavement service life by four to seven years depending on traffic volumes and environmental conditions. Preventive and corrective treatments include Hot Mix Asphalt (H.M.A.) thin overlay, chip seal, slurry seal, dig-out, concrete grinding, and concrete slab replacement. These treatments would typically be completed as a part of H.M.1 projects.

Capital Preventive Maintenance (C.A.P.M.) projects are typically applied to pavement with minor structural and poor I.R.I. pavement distresses. C.A.P.M. treatments can extend the service life by approximately five to ten years.

Treatment strategies include concrete grinding, concrete slab replacement, and H.M.A. medium overlay.

Major pavement rehabilitation is a more expensive type of treatment because it typically applies to locations with extensive existing structural distress. Rather than just surface repairs, major pavement rehabilitation requires a comprehensive pavement structure design engineered for future traffic loads over a 20-year or 40-year service life. Major rehabilitation strategies include J.P.C.P. or C.R.C.P. lane replacement, full-depth reclamation, and H.M.A. thick overlays with a thickness greater than 0.25-foot.

Table 22 provides the average costs for the three primary funding programs for pavement treatment from F.Y. 2018/19 through F.Y. 2019/20. Additional details for various treatments within each program are available in Appendix H to Appendix J.

TABLE 22. AVERAGE COST PER LANE-MILE FOR DIFFERENT FUNDING PROGRAMS FROM F.Y. 2018/19 THROUGH F.Y. 2019/20

<u>Funding Program</u>	<u>Cost per Lane-Mile</u>	<u>Expected Service Life</u>
H.M.1 (Preventive and Corrective Maintenance)	\$184,000	Four to seven years
C.A.P.M.	\$394,000	Five to 10 years
Major Rehabilitation	\$1,981,000	20 years or more

PAVEMENT EXPENDITURES AND FINANCIAL PLAN

Caltrans keeps track of awarded pavement projects as a part of its fiduciary responsibility. The information also allows Caltrans to extrapolate and plan for future pavement distresses based on the expected service life of the applied treatments. Table 23 summarizes the total capital costs and lane-miles for H.M.1 and S.H.O.P.P. pavement improvements from F.Y. 2018/19 through F.Y. 2019/20. As Caltrans applies asset management principles into its project planning, programming, and delivery, pavement treatments may be incorporated into projects that include work for other roadway features as well. As a result, the costs presented in Table 23 have been filtered for pavement-related contract bid items only. Project support costs were also excluded from the analysis.

TABLE 23. AWARDED PAVEMENT IMPROVEMENTS CAPITAL COSTS AND LANE-MILES FROM F.Y. 2018/19 TO F.Y. 2019/20

<u>Funding Program</u>	<u>F.Y. 2018/19 Million Dollar³</u>	<u>F.Y. 2018/19 Lane- Miles</u>	<u>F.Y. 2019/20 Million Dollar³</u>	<u>F.Y. 2019/20 Lane- Miles</u>	<u>Total Million Dollar³</u>	<u>Total Lane- Miles</u>
H.M.1	\$280	1,327	\$201	1,285	\$481	2,612
S.H.O.P.P. – C.A.P.M.	\$295	610	\$350	1,026	\$645	1,636
S.H.O.P.P. – Rehabilitation	\$985	524	\$1,038	497	\$2,023	1,021
S.H.O.P.P. – Minor A	\$3	3	\$3	7	\$6	10
S.H.O.P.P. – Sub-Total	\$1,283	1,137	\$1,391	1,530	\$2,674	2,667
Total H.M.1 & S.H.O.P.P.	\$1,563	2,464	\$1,592	2,815	\$3,155	5,278

From F.Y. 2018/19 through F.Y. 2019/20, Caltrans delivered over \$3.1 billion in pavement projects on nearly 5,300 lane-miles of roadway. Figure 9 presents a graph of the awarded pavement improvements capital costs and number of lane-miles for the four project types from F.Y. 2018/19 through F.Y. 2019/20.

³ Costs associated to pavement-related contract bid items only and exclude project support costs. It also does not include on-call maintenance contracts or Director's Order contracts.

FIGURE 9. AWARDED PAVEMENT IMPROVEMENTS CAPITAL COSTS AND LANE-MILES FROM F.Y. 2018/19 TO F.Y. 2019/20

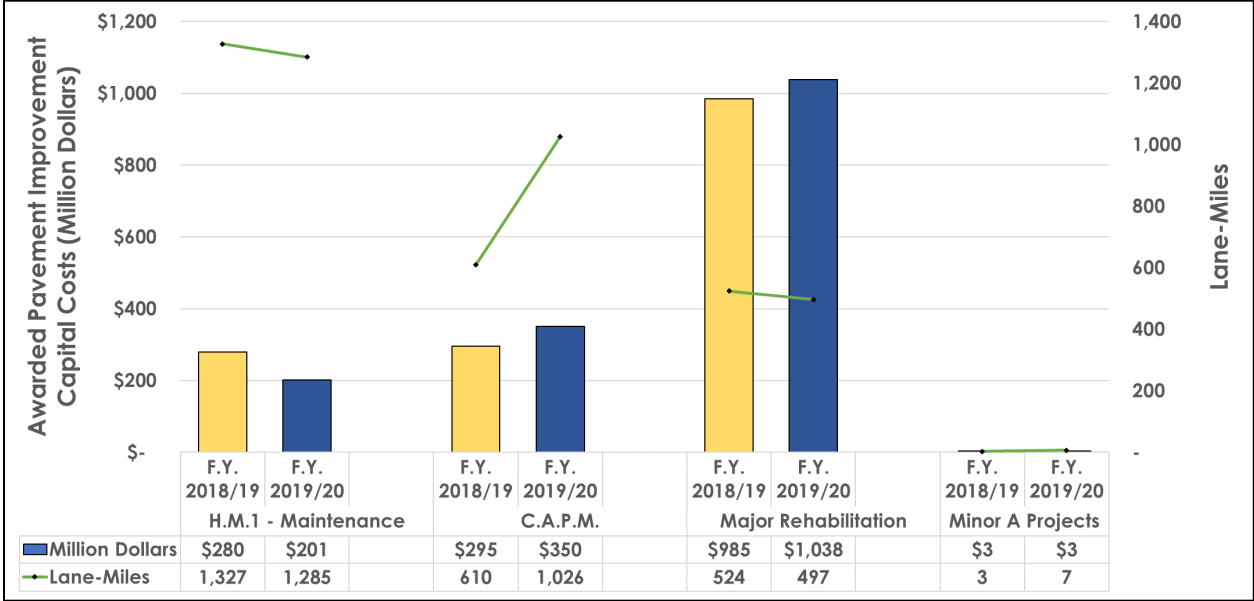


Figure 10 presents a detailed distribution of the pavement treatment strategies utilized in F.Y. 2018/19 for H.M.1 projects based on the awarded amount. H.M.A. medium overlay accounted for 32 percent of the total awarded amounts. At 31 percent, H.M.A. thin overlay was the second most awarded amount. At seven percent with a slightly higher total amount than slurry seal, cold in-place recycling – Class 3 was the third most awarded amount.

Figure 11 presents a detailed distribution of the pavement treatment strategies utilized in F.Y. 2018/19 for C.A.P.M. projects based on the awarded amount. H.M.A. medium overlay accounted for 38 percent of the total awarded amount. At 35 percent, combined strategies of multiple pavement treatments in one project was the second most awarded amount. Grind/replace slabs for concrete pavement was the third most awarded amount, accounting for 14 percent of the total amount.

Figure 12 presents a detailed distribution of the pavement treatment strategies utilized in F.Y. 2018/19 for major rehabilitation projects based on the awarded amount. At 38 percent, combined strategies of multiple pavement treatments in one project was the most awarded amount. The second most awarded amount was for C.R.C.P. lane replacement with 28 percent of the total amount. The third most award amount was for P.C.C. lane replacement at 25 percent of the total amount.

FIGURE 10. F.Y. 2018/19 H.M.1 PREVENTIVE AND CORRECTIVE MAINTENANCE STRATEGIES

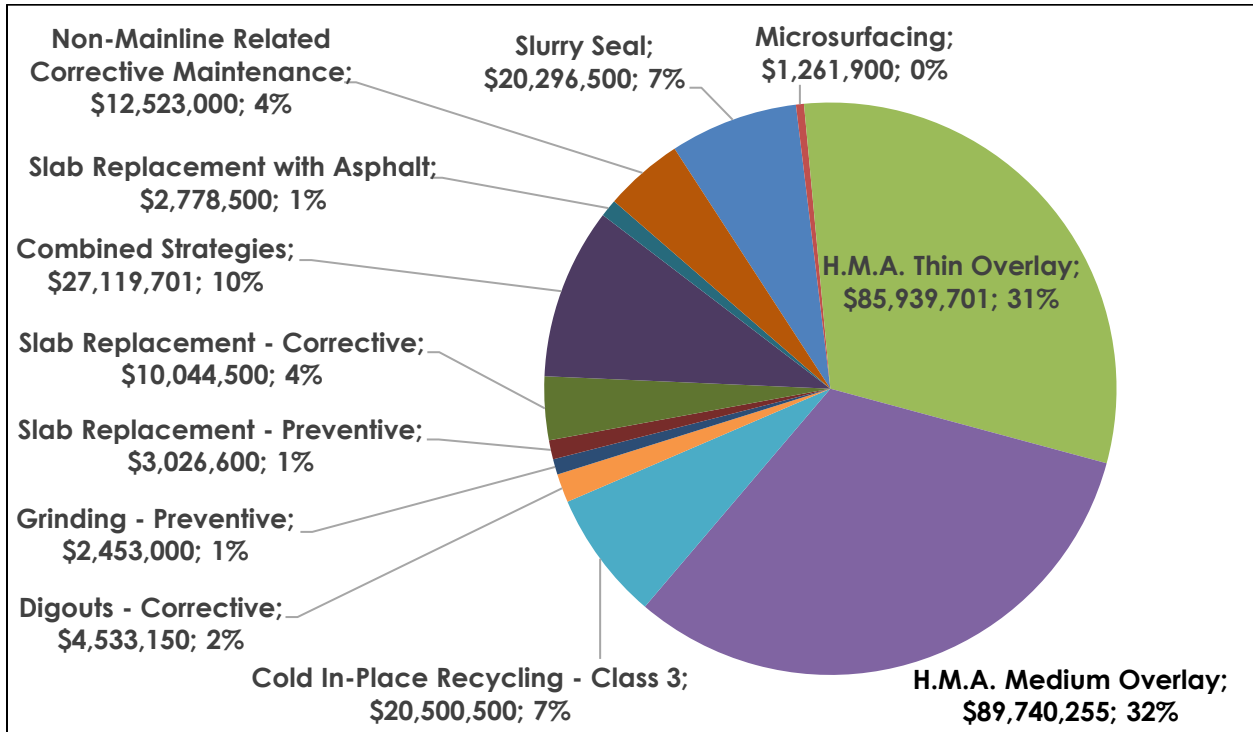


FIGURE 11. F.Y. 2018/19 C.A.P.M. STRATEGIES

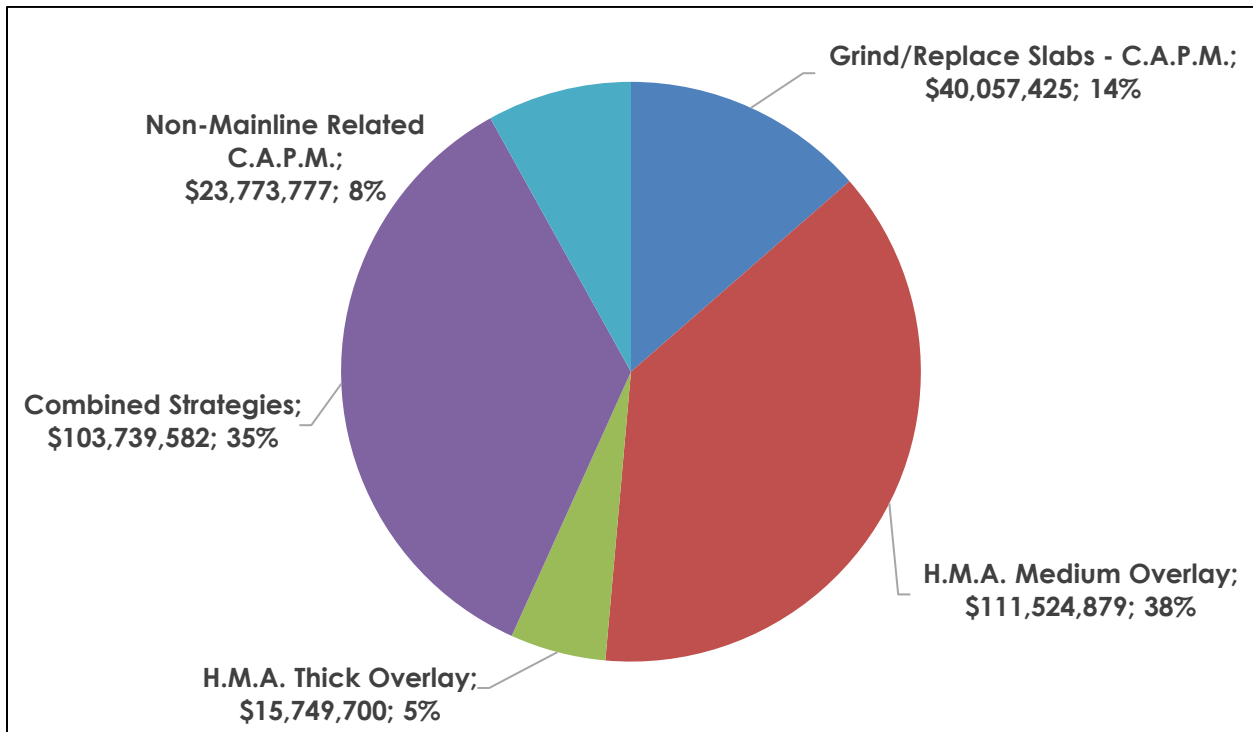


FIGURE 12. F.Y. 2018/19 MAJOR REHABILITATION STRATEGIES

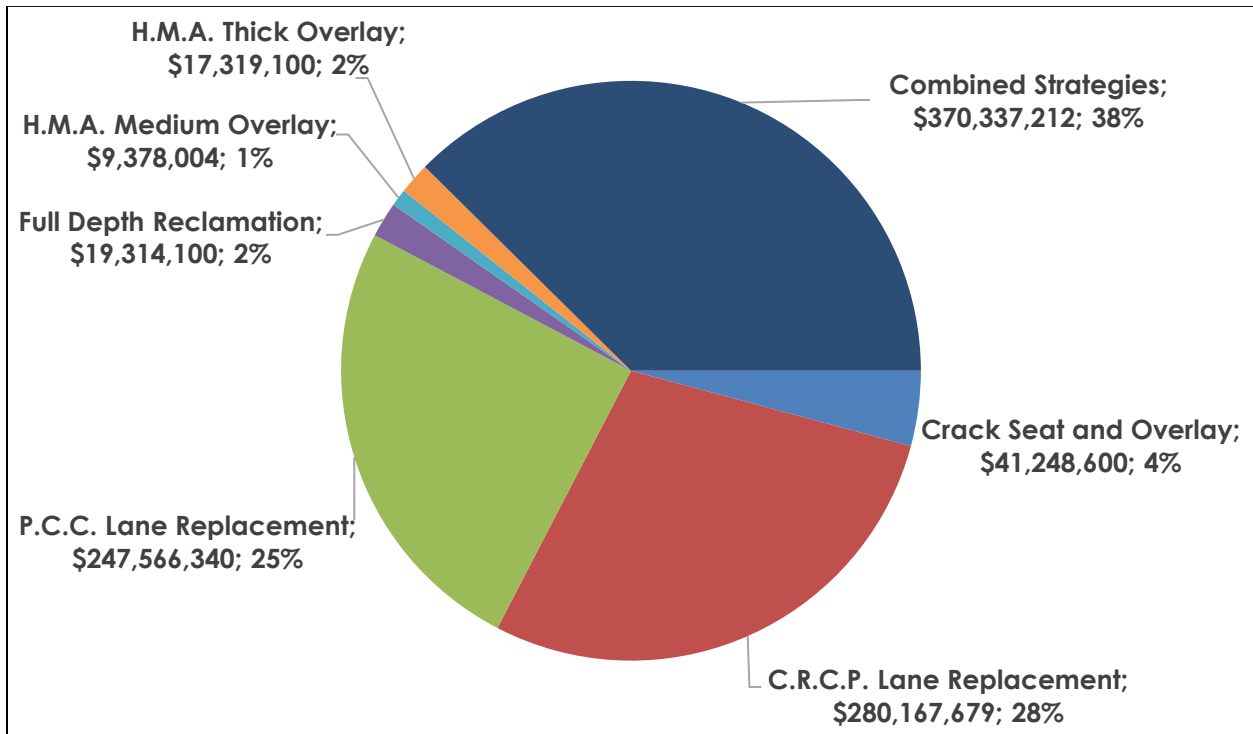


Figure 13 presents a detailed distribution of the pavement treatment strategies utilized in F.Y. 2019/20 for H.M.1 projects based on the awarded amount. H.M.A. thin overlay accounted for 50 percent of the total awarded amount. At 17 percent, H.M.A. medium overlay was the second most awarded amount. At nine percent, cold in-place recycling – Class 3 was the third most awarded amount.

Figure 14 presents a detailed distribution of the pavement treatment strategies utilized in F.Y. 2019/20 for C.A.P.M. projects based on the awarded amount. H.M.A. medium overlay accounted for 54 percent of the total awarded amount. At 24 percent, combined strategies of multiple pavement treatments in one project was the second most awarded amount. At 15 percent, grind/replace slabs the third most awarded amount.

Figure 15 presents a detailed distribution of the pavement treatment strategies utilized in F.Y. 2019/20 for major rehabilitation projects based on the awarded amount. At 55 percent, combined strategies of multiple pavement treatments in one project was the most awarded amount. P.C.C. lane replacement was the second most awarded with 31 percent of the total amount. C.R.C.P. lane replacement was the third most awarded with eight percent of the total amount.

FIGURE 13. F.Y. 2019/20 H.M.1 PREVENTIVE AND CORRECTIVE MAINTENANCE STRATEGIES

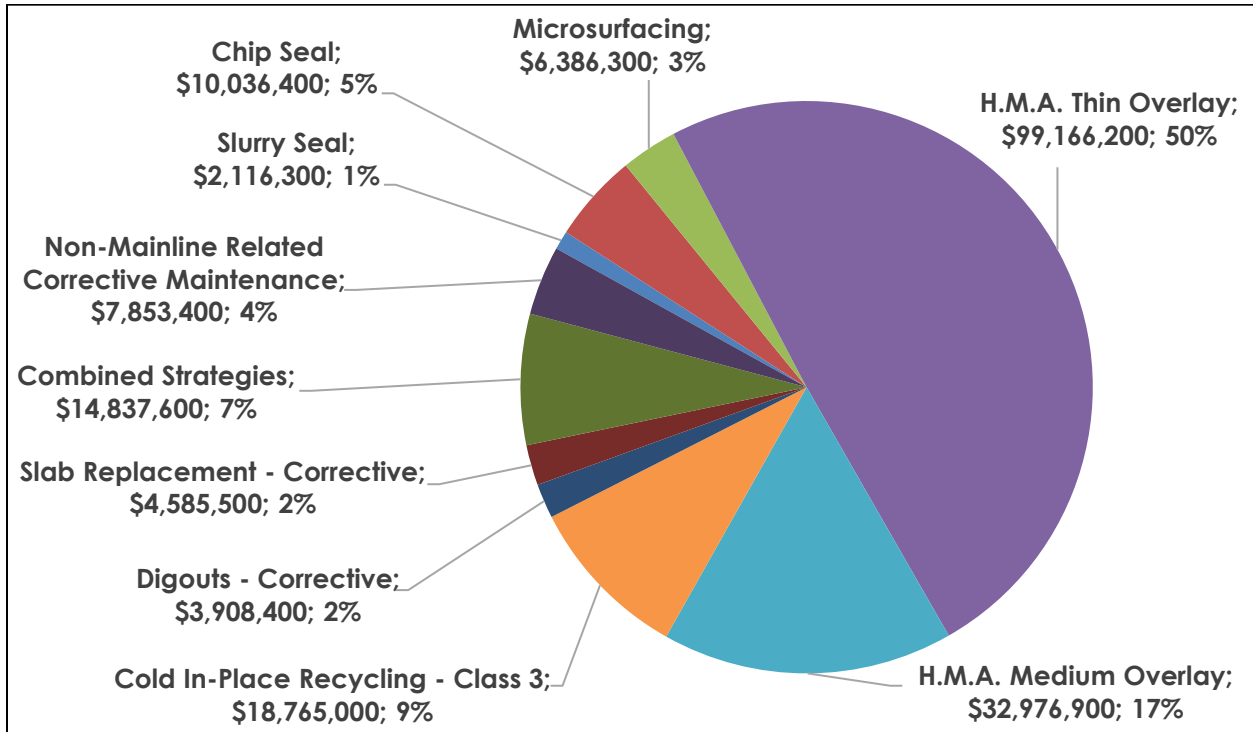


FIGURE 14. F.Y. 2019/20 C.A.P.M. STRATEGIES

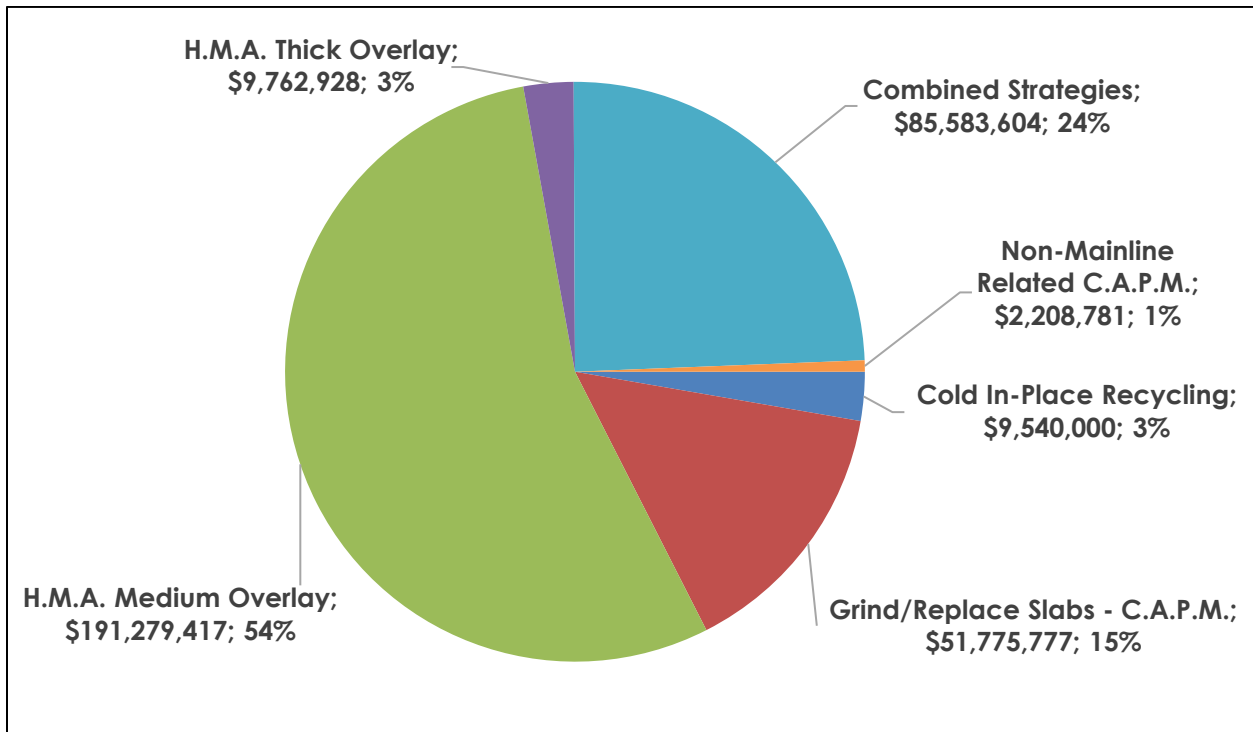


FIGURE 15. F.Y. 2019/20 MAJOR REHABILITATION STRATEGIES

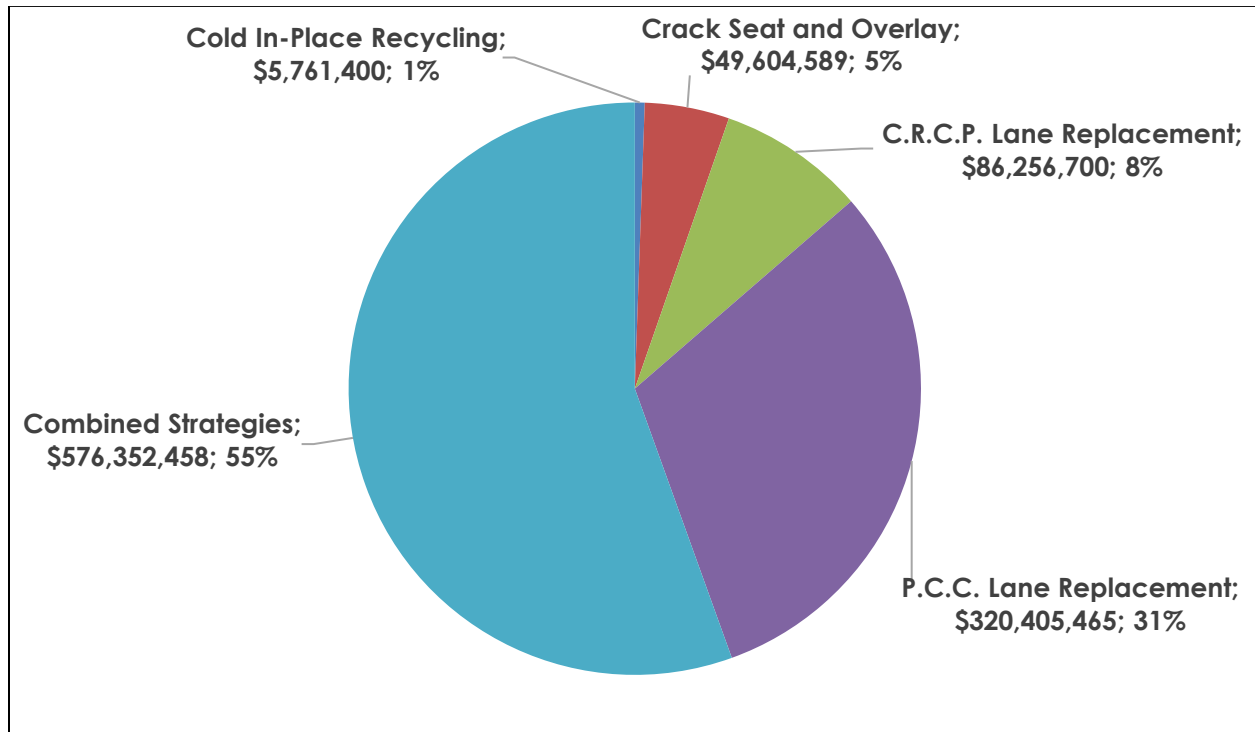
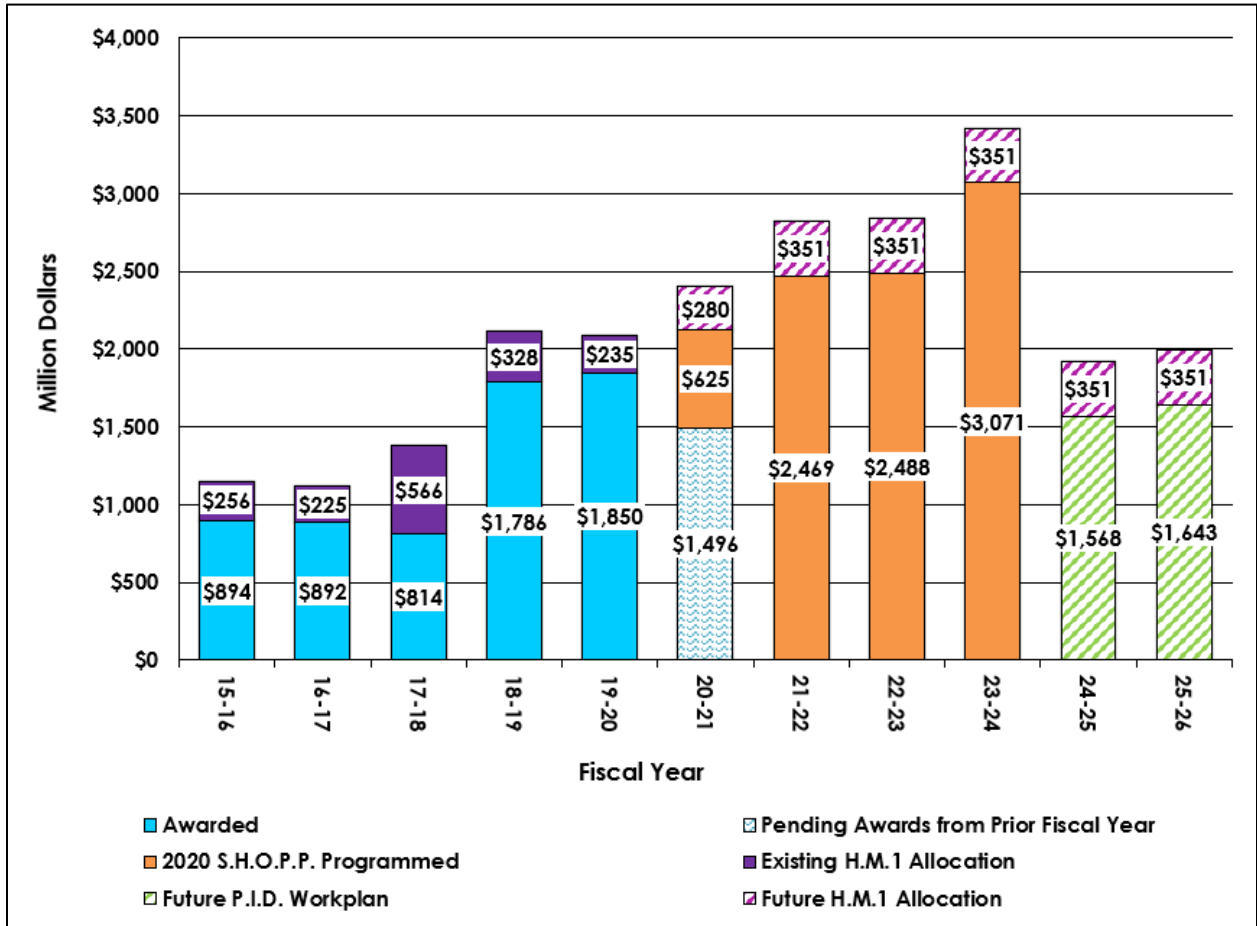


Figure 16 presents the financial plan for pavement improvements. It consists of existing expenditures as of the end of F.Y. 2019/20 and anticipated future expenditures for F.Y. 2020/21 and beyond. While the plan primarily focuses on pavement improvement projects, they may include work for other roadway features as Caltrans is committed to aligning its funding to effectively manage all of its assets. The dollar amounts represent project capital (excluding right-of-way) and support costs that would be accrued as of the Ready-to-List date for construction contract advertisement. Existing expenditures include S.H.O.P.P. projects that have been awarded and annual H.M.1 allocations. Future expenditures include programmed projects from the prior fiscal year that have not been awarded, approved projects from the 2020 S.H.O.P.P. plan to be programmed for F.Y. 2020/21 through F.Y. 2023/24, future H.M.1 allocations, and future projects that have been identified in the S.H.O.P.P. Project Initiation Document (P.I.D.) Workplan for F.Y. 2024/25 through F.Y. 2025/26.

FIGURE 16. FINANCIAL PLAN FOR PAVEMENT IMPROVEMENTS



APPENDIX A – CALTRANS DISTRICT BOUNDARY MAP



APPENDIX B – 2019 PAVEMENT CONDITION BY DISTRICT AND ROADWAY CLASSIFICATION, BASED ON FEDERAL PAVEMENT PERFORMANCE MEASURES

TABLE 24. 2019 PAVEMENT CONDITION BY DISTRICT AND ROADWAY CLASSIFICATION, BASED ON FEDERAL PAVEMENT PERFORMANCE MEASURES

District	Class 1 Good	Class 2 Good	Class 3 Good	Class 1 Fair	Class 2 Fair	Class 3 Fair	Class 1 Poor	Class 2 Poor	Class 3 Poor	Sub- Total
District 1	705 (30.3%)	316 (13.6%)	108 (4.6%)	337 (14.5%)	415 (17.9%)	434 (18.7%)	4 (0.2%)	1 (0.1%)	4 (0.2%)	2,323 (100%)
District 2	773 (19.5%)	964 (24.4%)	537 (13.6%)	207 (5.2%)	827 (20.9%)	622 (15.7%)	1 (0.0%)	8 (0.2%)	14 (0.4%)	3,953 (100%)
District 3	1,129 (25.6%)	1,054 (23.9%)	235 (5.3%)	705 (16.0%)	791 (18.0%)	444 (10.1%)	16 (0.4%)	11 (0.2%)	18 (0.4%)	4,403 (100%)
District 4	2,300 (38.0%)	531 (8.8%)	40 (0.7%)	1,319 (21.8%)	1,433 (23.7%)	317 (5.2%)	63 (1.0%)	42 (0.7%)	6 (0.1%)	6,051 (100%)
District 5	936 (29.7%)	657 (20.9%)	153 (4.9%)	266 (8.5%)	633 (20.1%)	481 (15.3%)	7 (0.2%)	8 (0.3%)	9 (0.3%)	3,150 (100%)
District 6	1,599 (32.0%)	891 (17.8%)	843 (16.9%)	429 (8.6%)	683 (13.7%)	505 (10.1%)	28 (0.6%)	5 (0.1%)	12 (0.2%)	4,995 (100%)
District 7	2,399 (39.8%)	424 (7.0%)	55 (0.9%)	2,002 (33.2%)	873 (14.5%)	173 (2.9%)	89 (1.5%)	14 (0.2%)	0 (0.0%)	6,029 (100%)
District 8	2,983 (45.2%)	718 (10.9%)	174 (2.6%)	1,549 (23.5%)	921 (14.0%)	145 (2.2%)	82 (1.2%)	27 (0.4%)	1 (0.0%)	6,600 (100%)
District 9	1,259 (49.4%)	431 (16.9%)	249 (9.8%)	288 (11.3%)	147 (5.8%)	169 (6.7%)	4 (0.1%)	0 (0.0%)	0 (0.0%)	2,548 (100%)
District 10	920 (26.3%)	943 (27.0%)	405 (11.6%)	323 (9.2%)	709 (20.3%)	173 (5.0%)	10 (0.3%)	14 (0.4%)	1 (0.0%)	3,498 (100%)
District 11	1,955 (47.0%)	407 (9.8%)	203 (4.9%)	761 (18.3%)	637 (15.3%)	190 (4.6%)	4 (0.1%)	6 (0.1%)	0 (0.0%)	4,162 (100%)
District 12	843 (43.0%)	173 (8.8%)	0 (0.0%)	594 (30.3%)	339 (17.3%)	1 (0.1%)	7 (0.4%)	1 (0.1%)	0 (0.0%)	1,960 (100%)
Statewide Total	17,801 (35.8%)	7,509 (15.1%)	3,002 (6.0%)	8,781 (17.7%)	8,409 (16.9%)	3,654 (7.4%)	314 (0.6%)	138 (0.3%)	64 (0.1%)	49,672 (100%)

APPENDIX C – 2018 PAVEMENT CONDITION BY DISTRICT AND ROADWAY CLASSIFICATION, BASED ON FEDERAL PAVEMENT PERFORMANCE MEASURES

TABLE 25. 2018 PAVEMENT CONDITION BY DISTRICT AND ROADWAY CLASSIFICATION, BASED ON FEDERAL PAVEMENT PERFORMANCE MEASURES

District	Class 1 Good	Class 2 Good	Class 3 Good	Class 1 Fair	Class 2 Fair	Class 3 Fair	Class 1 Poor	Class 2 Poor	Class 3 Poor	Sub- Total
District 1	705 (30.3%)	318 (13.7%)	101 (4.4%)	341 (14.6%)	412 (17.7%)	436 (18.8%)	4 (0.2%)	1 (0.0%)	8 (0.3%)	2,326 (100%)
District 2	850 (21.4%)	1,051 (26.5%)	468 (11.8%)	138 (3.5%)	739 (18.6%)	685 (17.3%)	1 (0.0%)	18 (0.5%)	21 (0.5%)	3,970 (100%)
District 3	1,224 (27.6%)	1,152 (26.0%)	228 (5.1%)	630 (14.2%)	716 (16.1%)	456 (10.3%)	10 (0.2%)	7 (0.1%)	16 (0.4%)	4,439 (100%)
District 4	2,175 (35.2%)	487 (7.9%)	32 (0.5%)	1,540 (24.9%)	1,523 (24.6%)	327 (5.3%)	62 (1.0%)	33 (0.5%)	6 (0.1%)	6,184 (100%)
District 5	933 (29.4%)	641 (20.2%)	139 (4.4%)	285 (9.0%)	643 (20.2%)	500 (15.7%)	9 (0.3%)	14 (0.4%)	10 (0.3%)	3,175 (100%)
District 6	1,570 (30.8%)	864 (17.0%)	840 (16.5%)	486 (9.5%)	755 (14.8%)	539 (10.6%)	26 (0.5%)	5 (0.1%)	10 (0.2%)	5,095 (100%)
District 7	2,230 (35.6%)	364 (5.8%)	54 (0.9%)	2,204 (35.2%)	1,085 (17.3%)	175 (2.8%)	120 (1.9%)	23 (0.4%)	0 (0.0%)	6,255 (100%)
District 8	2,916 (43.8%)	701 (10.5%)	143 (2.1%)	1,626 (24.4%)	999 (15.0%)	172 (2.6%)	90 (1.3%)	14 (0.2%)	1 (0.0%)	6,663 (100%)
District 9	1,338 (52.2%)	462 (18.0%)	264 (10.3%)	206 (8.0%)	133 (5.2%)	155 (6.1%)	4 (0.1%)	0 (0.0%)	0 (0.0%)	2,563 (100%)
District 10	1,003 (28.5%)	957 (27.2%)	400 (11.4%)	248 (7.1%)	694 (19.7%)	185 (5.3%)	14 (0.4%)	16 (0.4%)	1 (0.0%)	3,520 (100%)
District 11	1,897 (46.3%)	369 (9.0%)	185 (4.5%)	796 (19.4%)	685 (16.7%)	154 (3.8%)	4 (0.1%)	7 (0.2%)	0 (0.0%)	4,097 (100%)
District 12	818 (41.4%)	176 (8.9%)	0 (0.0%)	636 (32.2%)	338 (17.1%)	1 (0.1%)	6 (0.3%)	2 (0.1%)	0 (0.0%)	1,976 (100%)
Statewide Total	17,659 (35.1%)	7,543 (15.0%)	2,854 (5.7%)	9,138 (18.2%)	8,720 (17.4%)	3,786 (7.5%)	349 (0.7%)	140 (0.3%)	72 (0.1%)	50,261 (100%)

APPENDIX D – 2019 PAVEMENT CONDITION BY DISTRICT AND ROADWAY CLASSIFICATION, BASED ON CALTRANS PAVEMENT RATING SYSTEM

TABLE 26. 2019 PAVEMENT CONDITION BY DISTRICT AND ROADWAY CLASSIFICATION, BASED ON CALTRANS PAVEMENT RATING SYSTEM

District	Class 1 Green	Class 2 Green	Class 3 Green	Class 1 Yellow	Class 2 Yellow	Class 3 Yellow	Class 1 Red	Class 2 Red	Class 3 Red	Sub-Total
District 1	804 (34.6%)	448 (19.3%)	294 (12.6%)	182 (7.8%)	160 (6.9%)	70 (3.0%)	60 (2.6%)	124 (5.4%)	182 (7.8%)	2,323 (100%)
District 2	815 (20.6%)	983 (24.9%)	584 (14.8%)	145 (3.7%)	662 (16.7%)	400 (10.1%)	19 (0.5%)	155 (3.9%)	189 (4.8%)	3,953 (100%)
District 3	1,479 (33.6%)	1,261 (28.6%)	325 (7.4%)	232 (5.3%)	354 (8.0%)	165 (3.7%)	139 (3.2%)	241 (5.5%)	208 (4.7%)	4,403 (100%)
District 4	3,119 (51.5%)	999 (16.5%)	142 (2.3%)	254 (4.2%)	329 (5.4%)	47 (0.8%)	309 (5.1%)	678 (11.2%)	174 (2.9%)	6,051 (100%)
District 5	936 (29.7%)	739 (23.5%)	229 (7.3%)	203 (6.5%)	327 (10.4%)	194 (6.2%)	70 (2.2%)	233 (7.4%)	220 (7.0%)	3,150 (100%)
District 6	1,727 (34.6%)	1,028 (20.6%)	788 (15.8%)	218 (4.4%)	373 (7.5%)	385 (7.7%)	110 (2.2%)	179 (3.6%)	186 (3.7%)	4,995 (100%)
District 7	3,805 (63.1%)	726 (12.0%)	139 (2.3%)	233 (3.9%)	257 (4.3%)	35 (0.6%)	452 (7.5%)	328 (5.4%)	54 (0.9%)	6,029 (100%)
District 8	3,478 (52.7%)	748 (11.3%)	172 (2.6%)	745 (11.3%)	602 (9.1%)	77 (1.2%)	392 (5.9%)	317 (4.8%)	71 (1.1%)	6,600 (100%)
District 9	1,206 (47.3%)	417 (16.4%)	311 (12.2%)	300 (11.8%)	136 (5.4%)	85 (3.4%)	44 (1.7%)	25 (1.0%)	22 (0.9%)	2,548 (100%)
District 10	1,060 (30.3%)	977 (27.9%)	394 (11.3%)	126 (3.6%)	452 (12.9%)	156 (4.4%)	67 (1.9%)	237 (6.8%)	29 (0.8%)	3,498 (100%)
District 11	2,493 (59.9%)	633 (15.2%)	255 (6.1%)	140 (3.4%)	310 (7.4%)	114 (2.7%)	87 (2.1%)	108 (2.6%)	24 (0.6%)	4,162 (100%)
District 12	1,282 (65.4%)	344 (17.5%)	0 (0.0%)	82 (4.2%)	93 (4.7%)	1 (0.0%)	81 (4.1%)	78 (4.0%)	1 (0.0%)	1,960 (100%)
Statewide Total	22,204 (44.7%)	9,302 (18.7%)	3,634 (7.3%)	2,861 (5.8%)	4,053 (8.2%)	1,729 (3.5%)	1,831 (3.7%)	2,701 (5.4%)	1,358 (2.7%)	49,672 (100%)

APPENDIX E – 2018 PAVEMENT CONDITION BY DISTRICT AND ROADWAY CLASSIFICATION, BASED ON CALTRANS PAVEMENT RATING SYSTEM

TABLE 27. 2018 PAVEMENT CONDITION BY DISTRICT AND ROADWAY CLASSIFICATION, BASED ON CALTRANS PAVEMENT RATING SYSTEM

District	Class 1 Green	Class 2 Green	Class 3 Green	Class 1 Yellow	Class 2 Yellow	Class 3 Yellow	Class 1 Red	Class 2 Red	Class 3 Red	Sub-Total
District 1	801 (34.5%)	465 (20.0%)	248 (10.6%)	176 (7.6%)	121 (5.2%)	68 (2.9%)	72 (3.1%)	146 (6.3%)	229 (9.9%)	2,326 (100%)
District 2	838 (21.1%)	933 (23.5%)	539 (13.6%)	134 (3.4%)	740 (18.7%)	404 (10.2%)	17 (0.4%)	134 (3.4%)	230 (5.8%)	3,970 (100%)
District 3	1,462 (32.9%)	1,323 (29.8%)	332 (7.5%)	311 (7.0%)	395 (8.9%)	177 (4.0%)	90 (2.0%)	156 (3.5%)	192 (4.3%)	4,439 (100%)
District 4	3,231 (52.2%)	1,049 (17.0%)	142 (2.3%)	263 (4.2%)	337 (5.5%)	47 (0.8%)	283 (4.6%)	657 (10.6%)	176 (2.8%)	6,184 (100%)
District 5	944 (29.7%)	706 (22.2%)	212 (6.7%)	213 (6.7%)	350 (11.0%)	182 (5.7%)	71 (2.2%)	242 (7.6%)	255 (8.0%)	3,175 (100%)
District 6	1,680 (33.0%)	1,044 (20.5%)	815 (16.0%)	253 (5.0%)	347 (6.8%)	368 (7.2%)	150 (2.9%)	233 (4.6%)	206 (4.0%)	5,095 (100%)
District 7	3,724 (59.5%)	648 (10.4%)	142 (2.3%)	245 (3.9%)	386 (6.2%)	34 (0.6%)	583 (9.3%)	438 (7.0%)	53 (0.8%)	6,255 (100%)
District 8	3,636 (54.6%)	955 (14.3%)	180 (2.7%)	615 (9.2%)	455 (6.8%)	62 (0.9%)	381 (5.7%)	305 (4.6%)	74 (1.1%)	6,663 (100%)
District 9	1,100 (42.9%)	381 (14.9%)	308 (12.0%)	382 (14.9%)	182 (7.1%)	95 (3.7%)	67 (2.6%)	32 (1.3%)	16 (0.6%)	2,563 (100%)
District 10	1,086 (30.9%)	993 (28.2%)	400 (11.4%)	129 (3.7%)	460 (13.1%)	150 (4.3%)	50 (1.4%)	215 (6.1%)	37 (1.1%)	3,520 (100%)
District 11	2,491 (60.8%)	671 (16.4%)	223 (5.4%)	122 (3.0%)	261 (6.4%)	92 (2.3%)	84 (2.1%)	129 (3.2%)	24 (0.6%)	4,097 (100%)
District 12	1,325 (67.1%)	350 (17.7%)	0 (0.0%)	75 (3.8%)	87 (4.4%)	1 (0.0%)	59 (3.0%)	78 (4.0%)	1 (0.0%)	1,976 (100%)
Statewide Total	22,319 (44.4%)	9,517 (18.9%)	3,540 (7.0%)	2,918 (5.8%)	4,120 (8.2%)	1,680 (3.3%)	1,909 (3.8%)	2,765 (5.5%)	1,492 (3.0%)	50,261 (100%)

TABLE 28. 2019 N.H.S. INTERSTATE I.R.I.

<u>District</u>	<u>Lane-Miles of I.R.I. Less Than 95</u>	<u>Lane-Miles of I.R.I. Between 95 to 170</u>	<u>Lane-Miles of I.R.I. Greater Than 170</u>	<u>Sub-Total</u>
District 1	0	0	0	0
District 2	680	21	1	702
District 3	1,007	285	32	1,324
District 4	1,619	492	131	2,242
District 5	0	0	0	0
District 6	666	80	28	775
District 7	1,579	721	222	2,523
District 8	2,673	634	66	3,373
District 9	0	0	0	0
District 10	524	83	21	628
District 11	1,685	290	15	1,990
District 12	445	265	17	727
Statewide Total	10,879	2,871	533	14,283

TABLE 29. 2019 N.H.S. NON-INTERSTATE I.R.I.

<u>District</u>	<u>Lane-Miles of I.R.I. Less Than 95</u>	<u>Lane-Miles of I.R.I. Between 95 to 170</u>	<u>Lane-Miles of I.R.I. Greater Than 170</u>	<u>Sub-Total</u>
District 1	984	298	30	1,312
District 2	1,134	292	24	1,451
District 3	1,325	317	73	1,714
District 4	1,419	992	478	2,888
District 5	1,392	376	74	1,842
District 6	1,819	586	86	2,490
District 7	1,796	1,068	313	3,177
District 8	850	743	200	1,792
District 9	1,482	116	13	1,611
District 10	1,179	447	86	1,712
District 11	694	463	73	1,230
District 12	756	370	71	1,196
Statewide Total	14,830	6,066	1,521	22,417

TABLE 30. 2019 NON-N.H.S. I.R.I.

District	<u>Lane-Miles of I.R.I. Less Than 95</u>	<u>Lane-Miles of I.R.I. Between 95 to 170</u>	<u>Lane-Miles of I.R.I. Greater Than 170</u>	<u>Sub-Total</u>
District 1	236	506	269	1,011
District 2	976	680	145	1,801
District 3	624	506	235	1,365
District 4	167	410	344	920
District 5	486	562	260	1,308
District 6	1,050	525	154	1,729
District 7	92	171	66	329
District 8	758	546	131	1,435
District 9	664	239	34	937
District 10	790	307	61	1,157
District 11	430	462	50	942
District 12	5	26	7	37
Statewide Total	6,277	4,940	1,755	12,972

APPENDIX G – 2018 I.R.I. DISTRIBUTION BY DISTRICT AND HIGHWAY TYPE

TABLE 31. 2018 N.H.S. INTERSTATE I.R.I.

<u>District</u>	<u>Lane-Miles of I.R.I. Less Than 95</u>	<u>Lane-Miles of I.R.I. Between 95 to 170</u>	<u>Lane-Miles of I.R.I. Greater Than 170</u>	<u>Sub-Total</u>
District 1	0	0	0	0
District 2	671	38	1	710
District 3	1,044	271	18	1,333
District 4	1,519	630	148	2,298
District 5	0	0	0	0
District 6	643	98	35	777
District 7	1,430	853	274	2,557
District 8	2,627	688	76	3,391
District 9	0	0	0	0
District 10	565	59	7	631
District 11	1,631	311	17	1,959
District 12	411	319	25	755
Statewide Total	10,541	3,269	601	14,411

TABLE 32. 2018 N.H.S. NON-INTERSTATE I.R.I.

<u>District</u>	<u>Lane-Miles of I.R.I. Less Than 95</u>	<u>Lane-Miles of I.R.I. Between 95 to 170</u>	<u>Lane-Miles of I.R.I. Greater Than 170</u>	<u>Sub-Total</u>
District 1	946	332	41	1,319
District 2	1,083	330	45	1,458
District 3	1,342	330	63	1,735
District 4	1,349	1,099	512	2,960
District 5	1,361	421	93	1,875
District 6	1,813	655	91	2,559
District 7	1,645	1,267	383	3,295
District 8	785	809	211	1,805
District 9	1,496	104	9	1,609
District 10	1,137	482	102	1,721
District 11	667	510	70	1,247
District 12	708	401	73	1,182
Statewide Total	14,334	6,739	1,693	22,765

TABLE 33. 2018 NON-N.H.S. I.R.I.

District	<u>Lane-Miles of I.R.I. Less Than 95</u>	<u>Lane-Miles of I.R.I. Between 95 to 170</u>	<u>Lane-Miles of I.R.I. Greater Than 170</u>	<u>Sub-Total</u>
District 1	225	463	319	1,007
District 2	847	758	196	1,802
District 3	627	551	193	1,371
District 4	155	413	358	926
District 5	466	555	278	1,300
District 6	1,057	564	138	1,758
District 7	90	216	96	403
District 8	708	631	127	1,466
District 9	694	232	28	954
District 10	787	320	61	1,168
District 11	365	471	55	891
District 12	6	26	6	38
Statewide Total	6,028	5,201	1,856	13,085

APPENDIX H – H.M.1 MAINTENANCE STRATEGY COST PER LANE-MILE AND LANE-MILES TREATED FOR F.Y. 2018/19 THROUGH F.Y. 2019/20

TABLE 34. H.M.1 MAINTENANCE STRATEGY COST PER LANE-MILE

<u>H.M.1 Treatment Type</u>	<u>F.Y. 2018/19 Cost⁴ per Lane-Mile</u>	<u>F.Y. 2019/20 Cost⁴ per Lane-Mile</u>	<u>Weighted Average of Cost⁴ per Lane-Mile</u>
Chip Seal	Not Used	\$51,734	\$51,734
Slurry Seal	\$106,356	\$63,898	\$100,077
Micro Surfacing	\$46,904	\$74,792	\$68,111
H.M.A. Thin Overlay	\$161,650	\$180,562	\$171,260
H.M.A. Medium Overlay	\$235,284	\$207,491	\$227,109
Cold In-Place Recycling - Class 3	\$290,071	\$289,717	\$289,902
Dig Outs - Corrective	\$671,578	\$523,914	\$594,057
Grinding - Preventive	\$253,148	Not Used	\$253,148
Slab Replacement with Asphalt	\$2,621,226	Not Used	\$2,621,226
Slab Replacement - Preventive	\$2,161,857	Not Used	\$2,161,857
Slab Replacement - Corrective	\$6,277,813	\$3,057,000	\$4,719,355
Combined Strategies	\$259,191	\$77,923	\$142,206

TABLE 35. H.M.1 MAINTENANCE STRATEGY LANE-MILES TREATED

<u>H.M.1 Treatment Type</u>	<u>F.Y. 2018/19 Lane-Miles Treated</u>	<u>F.Y. 2019/20 Lane-Miles Treated</u>	<u>Average of Lane-Miles Treated</u>
Chip Seal	Not Used	194	194
Slurry Seal	191	33	112
Micro Surfacing	27	85	56
H.M.A. Thin Overlay	532	549	540
H.M.A. Medium Overlay	381	159	270
Cold In-Place Recycling - Class 3	71	65	68
Dig Outs - Corrective	7	7	7
Grinding - Preventive	10	Not Used	10
Slab Replacement with Asphalt	1	Not Used	1
Slab Replacement - Preventive	1	Not Used	1
Slab Replacement - Corrective	2	2	2
Combined Strategies	105	190	148

⁴ Costs associated to pavement-related contract bid items only and exclude project support costs. It does not also include on-call maintenance contracts or Director's Order contracts.

APPENDIX I – S.H.O.P.P. - C.A.P.M. STRATEGY COST PER LANE-MILE AND LANE-MILES TREATED FOR F.Y. 2018/19 THROUGH F.Y. 2019/20

TABLE 36. C.A.P.M. STRATEGY COST PER LANE-MILE

<u>C.A.P.M. Treatment Type</u>	<u>F.Y. 2018/19 Cost⁵ per Lane-Mile</u>	<u>F.Y. 2019/20 Cost⁵ per Lane-Mile</u>	<u>Weighted Average of Cost⁵ per Lane-Mile</u>
Cold In-Place Recycling	Not Used	\$450,000	\$450,000
Grind/Replace Slabs – C.A.P.M.	\$466,326	\$301,260	\$356,269
H.M.A. Medium Overlay	\$521,001	\$340,605	\$390,390
H.M.A. Thick Overlay	\$600,858	\$442,122	\$528,277
Combined Strategies	\$365,527	\$344,510	\$355,718

TABLE 37. C.A.P.M. STRATEGY LANE-MILES TREATED

<u>C.A.P.M. Treatment Type</u>	<u>F.Y. 2018/19 Lane-Miles Treated</u>	<u>F.Y. 2019/20 Lane-Miles Treated</u>	<u>Average of Lane-Miles Treated</u>
Cold In-Place Recycling	Not Used	21	21
Grind/Replace Slabs – C.A.P.M.	86	172	129
H.M.A. Medium Overlay	214	562	388
H.M.A. Thick Overlay	26	22	24
Combined Strategies	284	248	266

⁵ Costs associated to pavement-related contract bid items only and exclude project support costs. It does not also include on-call maintenance contracts or Director's Order contracts.

APPENDIX J – S.H.O.P.P. - REHABILITATION STRATEGY COST PER LANE-MILE AND LANE-MILES TREATED FOR F.Y. 2018/19 THROUGH F.Y. 2019/20

TABLE 38. REHABILITATION STRATEGY COST PER LANE-MILE

<u>Rehabilitation Treatment Type</u>	<u>F.Y. 2018/19 Cost⁶ per Lane-Mile</u>	<u>F.Y. 2019/20 Cost⁶ per Lane-Mile</u>	<u>Weighted Average of Cost⁶ per Lane-Mile</u>
Cold In-Place Recycling	Not Used	\$514,411	\$514,411
Crack Seal and Overlay	\$2,325,175	\$1,148,254	\$1,480,607
C.R.C.P. Lane Replacement	\$2,473,406	\$2,603,111	\$2,502,817
P.C.C. Lane Replacement	\$1,428,542	\$1,561,849	\$1,500,804
Full Depth Reclamation	\$1,073,006	Not Used	\$1,073,006
H.M.A. Medium Overlay	\$375,120	Not Used	\$375,120
H.M.A. Thick Overlay	\$666,119	Not Used	\$666,119
Combined Strategies	\$2,455,654	\$1,940,172	\$2,158,741

TABLE 39. REHABILITATION STRATEGY LANE-MILES TREATED

<u>Rehabilitation Treatment Type</u>	<u>F.Y. 2018/19 Lane-Miles Treated</u>	<u>F.Y. 2019/20 Lane-Miles Treated</u>	<u>Average of Lane-Miles Treated</u>
Cold In-Place Recycling	Not Used	11	11
Crack Seal and Overlay	17	43	30
C.R.C.P. Lane Replacement	113	33	73
P.C.C. Lane Replacement	173	205	189
Full Depth Reclamation	18	Not Used	18
H.M.A. Medium Overlay	25	Not Used	25
H.M.A. Thick Overlay	26	Not Used	26
Combined Strategies	151	205	178

⁶ Costs associated to pavement-related contract bid items only and exclude project support costs. It does not also include on-call maintenance contracts or Director's Order contracts.