

Carson City Pavement Management Plan



Fiscal Year 2019-2023
Draft

Executive Summary

Staff has developed a proposed Pavement Management Plan for Fiscal Year 2019-2023, which formalizes and establishes an efficient and effective strategy for preserving and maintaining the City’s 676 lane-miles of roadway. The Plan establishes five performance districts within the City and a five-year rotating schedule to streamline work efforts. The Plan provides a predictable use of roadway funding while maintaining flexibility for unplanned City projects and “match” for grant funding opportunities, as needed.

The five Performance Districts will improve transparency and target cost-saving strategies. The Plan identifies current conditions and establishes performance measures to monitor pavement conditions over time. The 2017 overall pavement condition within Carson City is rated Fair, with a pavement condition index (PCI) rating of 65 out of a 100 point scale.

This Plan establishes a process to share and track the City’s pavement conditions. Using the Pavement Condition Index (PCI) rating, the City will be able to set targets for improving pavement conditions at a city-wide level and for different transportation facilities, including regional and local roadways. Target setting will help staff and decision makers annually evaluate the allocation of resources for maintaining pavement infrastructure.

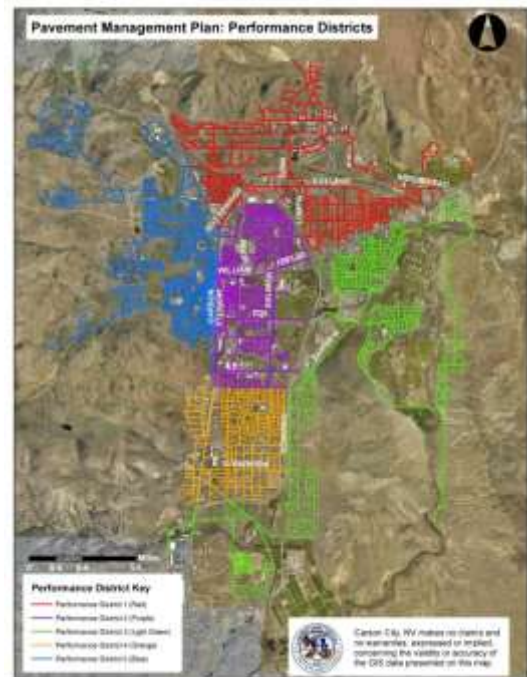
The table below identifies the five performance districts and their 2017 pavement condition.

Pavement Condition Index (PCI) Rating by Performance Districts						
Performance Districts	District 1 (Red)	District 2 (Purple)	District 3 (Light Green)	District 4 (Orange)	District 5 (Blue)	City-wide Average
Pavement Condition	Fair (PCI 64)	Fair (PCI 65)	Fair (PCI 65)	Fair (PCI 63)	Fair (PCI 70)	Fair (PCI 65)

The Plan establishes a five year Capital Improvement Program with an annual budget and project selection process to select, design, and construct pavement projects, for one district per year on a City-wide, rotating five year cycle. The Plan identifies project evaluation criteria to consistently and transparently prioritize projects.

The leading criteria include:

- Pavement Condition
- Preventive and Corrective Maintenance Schedule
- Roadway Functional Classification
- Safety



A large percentage of the Carson City Regional Transportation Commission (RTC) funding will be programmed to implement the Pavement Management Plan and a small percentage will remain unencumbered to maintain a level of responsiveness for unforeseen needs and to capitalize on funding opportunities as they become available.

Annual Implementation Schedule (1 District/Year)

Pavement Inspections	May – June
Project Evaluation	July – August
Project Selection & Public Posting	September – October
Project Design	October – January
Advertise Project(s) for Bidding	January – February
Project Execution/Notice to Proceed	February – March
Project Construction	March – October

The performance districts and annual schedule were developed to streamline delivery of pavement projects. Below are the anticipated benefits from implementation of the Pavement Management Plan.

Performance-Based Framework and Funding

- Contributes to, and aligns with, the City’s asset management initiative
- Annual reporting of pavement conditions city-wide and by district
- Annual reporting tracks progress toward target PCI to assist decision makers in priority based budgeting
- Predictable use of funding that maintains flexibility for unplanned City projects and “match” for funding opportunities as needed

Annual Schedule and Project Selection

- Transparent schedule and priorities for residents & decision makers
- Consistent project delivery
- Prioritizes cost effective pavement preservations treatments
- Annual rotation of performance districts allow for advanced scheduling and streamlined Public Works operations (e.g. Shouldering, crack sealing, signage, painting, traffic signal upgrades and utility maintenance)
- Improved cross-department coordination with utility improvements, a dig once approach
- Mobilization & testing costs may be minimized through geographic concentration of projects and larger contract amounts (economies of scale)
- Early advertising of construction projects for more competitive bid pricing



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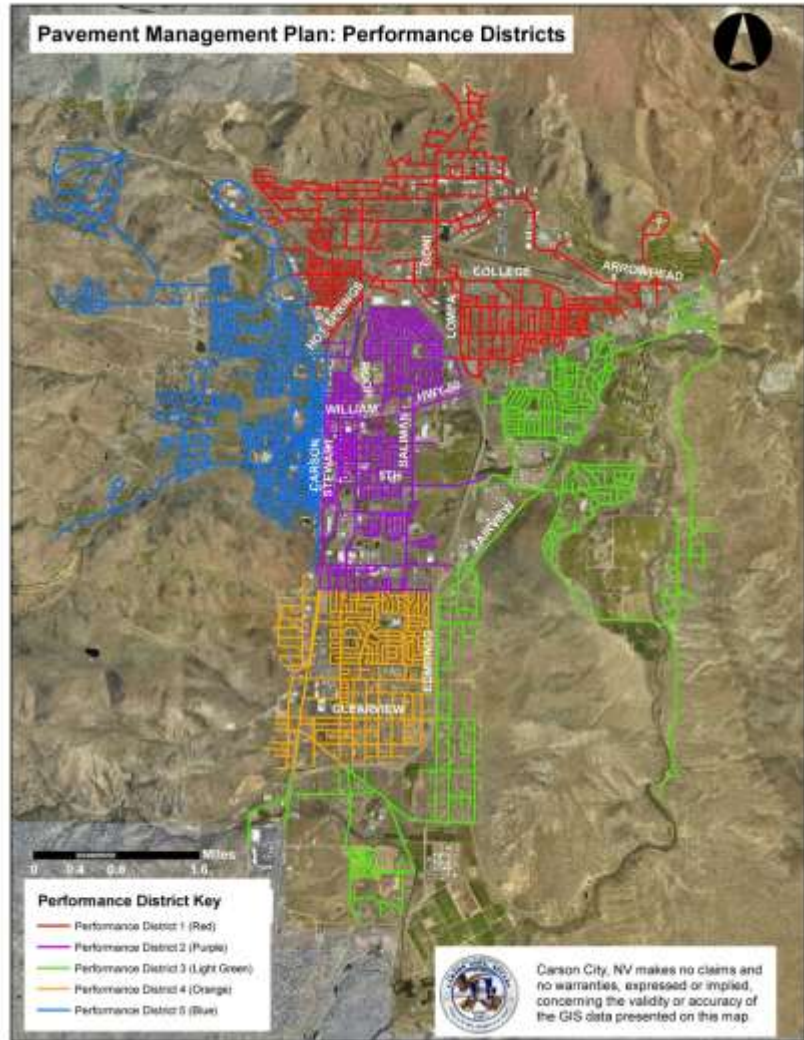


Introduction

This Pavement Management Plan sets out a defined strategy and process for Carson City Public Works. This plan is a living document to be followed and updated by an interdisciplinary team, comprised of a construction inspector, engineer, and planner. The purpose of this document is to consistently and efficiently evaluate, select, design, and implement pavement projects annually.

This Plan formalizes five Performance Districts. The performance districts and annual schedule were developed to streamline delivery of pavement projects. Use of performance districts facilitates more efficient and effective pavement condition monitoring over time and prompt identification of immediate maintenance and rehabilitation needs. Lane miles and pavement conditions by facility type, such as regional and local roadways, were considered to create districts with balanced needs. Political boundaries were reviewed to ensure that a performance district was not contained within a single political boundary. Project limits may extend across performance district boundaries if determined by engineering judgement.

District specific maps with more detail are provided in Appendix C.



Performance-Based Framework

This Plan establishes a process to share and track the City’s pavement conditions. This aligns with the City’s asset management initiative. Annual reporting will assist decision makers in priority based budgeting. Using the Pavement Condition Index (PCI) rating, the City will be able to set targets for improving pavement conditions. Target setting will help staff and decision makers evaluate the allocation of resources for maintaining pavement infrastructure.

2017 Performance Districts Characteristics						
Characteristics	District 1 (Red)	District 2 (Purple)	District 3 (Light Green)	District 4 (Orange)	District 5 (Blue)	City-wide Average
Weighted PCI	Fair (PCI 64)	Fair (PCI 65)	Fair (PCI 65)	Fair (PCI 63)	Fair (PCI 70)	Fair (PCI 65)
Total Lane Miles	124	143	136	142	131	676
Regional Roads Lane Miles	39	41	59	83	59	281
Local Road Lane Miles	85	102	77	59	72	395

By focusing on pavement condition, the PCI rating allows staff to target the most effective time to perform pavement preservation treatments. Pavement preservation treatments are the most efficient use of the City’s limited resources, because the treatments are typically low cost and preserve past investment in infrastructure. As a result, this Plan proposes pavement condition targets that align with the most effective time to perform preservation treatments.

- Pavement Condition Index Rating Target for Regional Roads – 75 and above
- Pavement Condition Index Rating Target for Local Roads – 70 and above

Pavement Condition Index (PCI)											
	Facility Type	Actual PCI									
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Performance District 1 Red	Regional Roads	68	67	67							
	Local Roads	63	63	62							
	All Roads	65	65	64							
Performance District 2 Purple	Regional Roads	69	60	69							
	Local Roads	66	69	62							
	All Roads	67	64	65							
Performance District 3 Light Green	Regional Roads	71	51	78							
	Local Roads	64	60	63							
	All Roads	63	55	70							
Performance District 4 Orange	Regional Roads	75	73	68							
	Local Roads	67	64	58							
	All Roads	71	69	63							
Performance District 5 Blue	Regional Roads	67	67	65							
	Local Roads	68	69	65							
	All Roads	68	68	65							
City-wide	Regional Roads	69	68	68							
	Local Roads	64	63	62							
	All Roads	66	65	65							



Approach to Funding

The Plan's approach to funding provides a predictable use of roadway funding while maintaining flexibility for unplanned City projects and "match" for grant funding opportunities, as needed. Currently, two city budgets fund the maintenance and capital improvements for the City's transportation network. The two budget funds are Street Maintenance and the Regional Transportation Commission (RTC). These budgets are primarily funded by the Carson City share of federal and state fuel tax, a portion of the City's sales tax, and from grant awards.

The Pavement Management Plan will establish a Five Year Capital Improvement Program (CIP), funded through the Transportation Infrastructure account in the RTC budget. 80 percent of the funding will be used to implement the strategies outlined in this Pavement Management Plan and will follow the annual performance district cycle. The remaining funds in this account will be used for unplanned City-wide improvements and grant opportunities. Street Maintenance funding will continue to be used for maintenance activities, such as crack filling, street repair, street sweeping, snow plowing, and the maintenance of signs, signals, sidewalks, shoulders and striping City-wide. Funding for these activities from the Street Maintenance budget will be tracked by performance district.

If supplemental funds are allocated to the program within the five year cycle, as a one-time allocation or as an increase to the budgeted Transportation Infrastructure fund, **efforts will be made to distribute funding across performance districts in accordance with the project selection and cost saving strategies in this plan.** ~~equal distribution to the five performance districts will occur.~~ **Any additional funding will be used in the allocated fiscal year and staff will document how and where funding is used.** This allows for and encourages future funding opportunities into this five year program.

Annual Implementation Schedule (1 District/Year)

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Pavement Inspections (May–June)

Manual pavement inspections will be conducted annually on a performance district prior to the evaluation and selection of projects. This will provide an accurate Pavement Condition Index (PCI) rating for all roads within a performance district based on current conditions. Reliance on these inspections will play a critical role in performance-based asset management and facilitates a feasible approach for continuous maintenance of the City's transportation infrastructure condition database. Additional inspections may need to be completed to maintain an accurate city-wide PCI rating.



Project Evaluation (July–August)

Pavement projects will be selected based on multiple evaluation factors. One of these factors is the pavement condition index (PCI) rating. The City uses the following PCI ranges to categorize the relative condition of a roadway: 86 to 100 is Good; 71 to 85 is Satisfactory; 56 to 70 is Fair; 41 to 55 is Poor; 26 to 40 is Very Poor; 11 to 25 is Serious; and less than 11 is Failed.

The PCI rating is calculated using standards developed by the U.S. Army Corps of Engineers and measures the type, extent, and severity of pavement surface distresses and smoothness of the road. The PCI helps to evaluate the rate of pavement deterioration and to develop an appropriate preventive maintenance strategy.

The following PCI ranges are used to help determine the appropriate pavement treatment:

- Corrective Maintenance – Eligible at PCI of 65 or greater
- Surface Preservation – Eligible at PCI of 65 or greater
- Surface Rehabilitation – Eligible at PCI between 41 and 65
- Reconstruction – Eligible at PCI less than 40

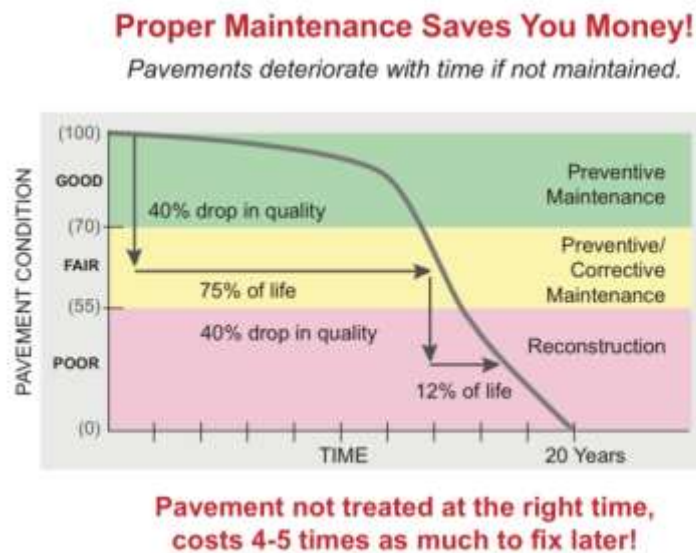


The remaining factors will further prioritize projects:

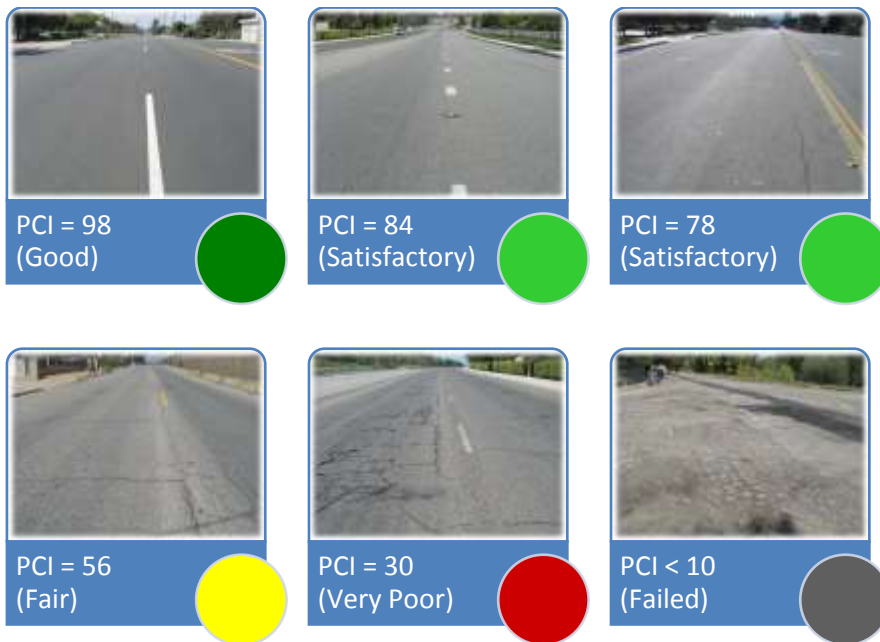
- Preventive and Corrective Maintenance Schedule (per industry standards)
- Roadway Functional Classification
- Safety Needs/Targets
- Traffic volume
- Construction Efficiencies
- Funding Eligibility and Availability of Federal Competitive/Discretionary Grant Funding

Preventive and corrective maintenance projects are a high priority of this Plan. When streets begin to fail, they fail quickly and the costs to repair them increases dramatically. Focusing on maintaining streets in good condition provides the most efficient use of the City's limited resources.

To capitalize on opportunities for construction cost savings, large projects with a particular type of pavement treatment within a consolidated geographic area are likely to be recommended over smaller dispersed projects in which the City would have multiple contractors. This approach reduces mobilization costs and capitalizes on economies of scale.



Visualizing Pavement Condition Index Rating



Roadway Functional Classification Explained

The functional classification of roadways defines the role of each individual facility within the larger City-wide roadway network. Functional classification carries with it requirements and expectations for roadway design, including: speed, capacity, and relationship to existing and future land use development. Federal legislation continues to use functional classification in determining eligibility for funding under the Federal-aid program.

- Arterials Roadways - provide service for trips of moderate length, serve geographic areas that are smaller than their higher classified roadways and offer connectivity to the larger, regional roadway. In an urban context, provide inter and intra-community continuity.
- Collectors Roadways - serve a critical role in the roadway network by gathering traffic from local roads and funneling them to the arterial network.
- Local Roadways - account for the largest percentage of roadway in terms of mileage. They are not intended for use in long distance travel, except at the origin or destination end of the trip.

A current Functional Classification Map is available on the Nevada Department of Transportation website at:

<https://www.nevadadot.com/doing-business/about-ndot/ndot-divisions/planning/roadway-systems/functional-classification-maps/carson-city>

[click on map](#)



Project Selection & Public Posting (September–October)

In September or October of each year, projects will be presented to the Carson City Regional Transportation Commission (RTC) for approval. Selected projects will be based on the project evaluation factors discussed in the previous section alongside consideration of available funding. A dedicated webpage will provide information on the annual process.

Project Design (October–January)

Project design begins after the Carson City RTC selects and approves the annual pavement projects. The length of time required to design is very dependent on the type of project. Preventative maintenance projects typically have a shorter design phase compared to a reconstruction project, however, even maintenance projects can necessitate a comprehensive design because each project requires staff evaluation of potential opportunities to upgrade outdated utilities or make other facility improvements to address issues such as ADA accessibility, **Complete Streets**, poor street design, or failing storm drainage infrastructure.

Advertise Project(s) for Bidding (January–February)

Once the design phase is complete, construction projects will be advertised for private construction firms to submit proposals consistent with Carson City purchasing and contract policies. Cost proposals fluctuate with market conditions. If cost proposals are above estimates, projects may need to be scaled down or the number of projects reduced.

Project Execution/Notice to Proceed (February-March)

Once cost proposals are accepted, City staff will procure for the construction services through a contract, **in accordance with the City's Purchasing and Contracts Policies and Procedures**. ~~Contracts over \$100,000 will need to be approved by the RTC.~~ After contract execution, staff will update the webpage with a final list of projects.

Project Construction (March-October)

Once a contract is executed, construction can begin. The actual start date will depend on a variety of factors, but mainly contractor availability and weather. Residences and businesses abutting the construction area will be notified prior to construction activity.

Consultation Program with the University Nevada, Reno

Through a bi-annual cooperative program between the Carson City Public Works and the Engineering and Science Program at the University of Nevada, Reno, Carson City staff is able to consult with experts in pavement engineering. This consultation assists staff in roadway design and construction matters, helping City staff to deliver long-lasting roads throughout Carson City.



Appendix A – Project List

Project List					
Street	From	To	Treatment	Performance District	Fiscal Year Funding
Airport Road	College Pkwy	US 50	Slurry Seal	1	2018
Stewart Street	William Street	Carson Street	Slurry Seal	2	2018
William Street	Carson Street	Minnesota Street	Slurry Seal	5	2018
Fifth Street	Warm Spring Court	Saliman Road	Micro Seal	2	2018
Fifth Street	Fairview Drive	Warm Spring Court	Micro Seal	3	2018
Arrowhead Drive	Imus Road	Emerson Drive	Micro Seal	1	2018
Carson River Road	Fifth Street	Sierra Vista Lane	Micro Seal	3	2018
Koontz Lane	Edmonds Drive	Curry Street	Micro Seal	4	2018
College Parkway	Carson Street	N. Ormsby	Micro Seal	5	2018
Medical Parkway	Carson Street	Presti Lane	Micro Seal	5	2018
Edmonds Drive	Fairview Drive	Snyder Avenue	Micro Seal	3	2018
Snyder Avenue	Edmonds Drive	Bigelow Drive	Micro Seal	3	2018
Airport Road	College Pkwy	US 50	Crack Seal	1	2018
Stewart Street	William Street	Carson Street	Crack Seal	2	2018
William Street	Carson Street	Minnesota Street	Crack Seal	5	2018
Fifth Street	Warm Spring Court	Saliman Road	Crack Seal	2	2018
Fifth Street	Fairview Drive	Warm Spring Court	Crack Seal	3	2018
Arrowhead Drive	Imus Road	Emerson Drive	Crack Seal	1	2018
Carson River Road	Fifth Street	Sierra Vista Lane	Crack Seal	3	2018
Koontz Lane	Edmonds Drive	Curry Street	Crack Seal	4	2018
College Parkway	Carson Street	N. Ormsby	Crack Seal	5	2018
Medical Parkway	Carson Street	Presti Lane	Crack Seal	5	2018
Edmonds Drive	Fairview Drive	Snyder Avenue	Crack Seal	3	2018
Snyder Avenue	Edmonds Drive	Bigelow Drive	Crack Seal	3	2018

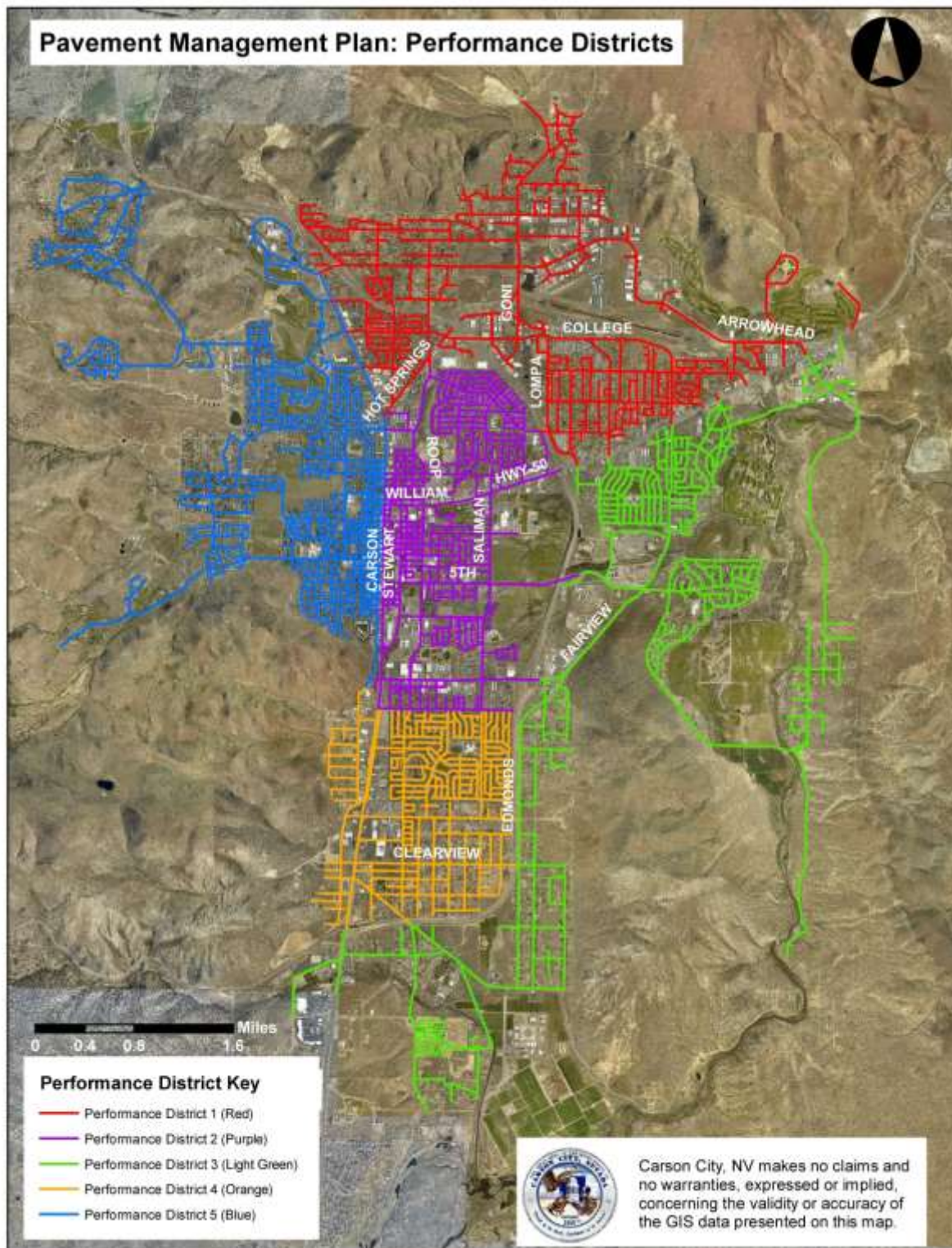


Appendix B – Annual Performance Report Card

Annual Performance Report Card 2017				
City-wide	Road Lane Miles	Current PCI	% Change From Previous	Target PCI Range
All Roads	676	65	0%	n/a
Regional Roads	281	68	0%	75
Local Roads	395	62	-2%	70
District 1	Road Lane Miles	Current PCI	% Change From Previous	Target PCI Range
All Roads	124	64	-2%	n/a
Regional Roads	39	67	0%	75
Local Roads	85	62	-2%	70
District 2	Road Lane Miles	Current PCI	% Change From Previous	Target PCI Range
All Roads	143	65	2%	n/a
Regional Roads	41	69	13%	75
Local Roads	102	62	-11%	70
District 3	Road Lane Miles	Current PCI	% Change From Previous	Target PCI Range
All Roads	131	70	21%	n/a
Regional Roads	59	78	35%	75
Local Roads	72	63	5%	70
District 4	Road Lane Miles	Current PCI	% Change From Previous	Target PCI Range
All Roads	142	63	-10%	n/a
Regional Roads	83	68	-7%	75
Local Roads	59	58	-10%	70
District 5	Road Lane Miles	Current PCI	% Change From Previous	Target PCI Range
All Roads	136	65	-5%	n/a
Regional Roads	59	65	-3%	75
Local Roads	77	65	-6%	70



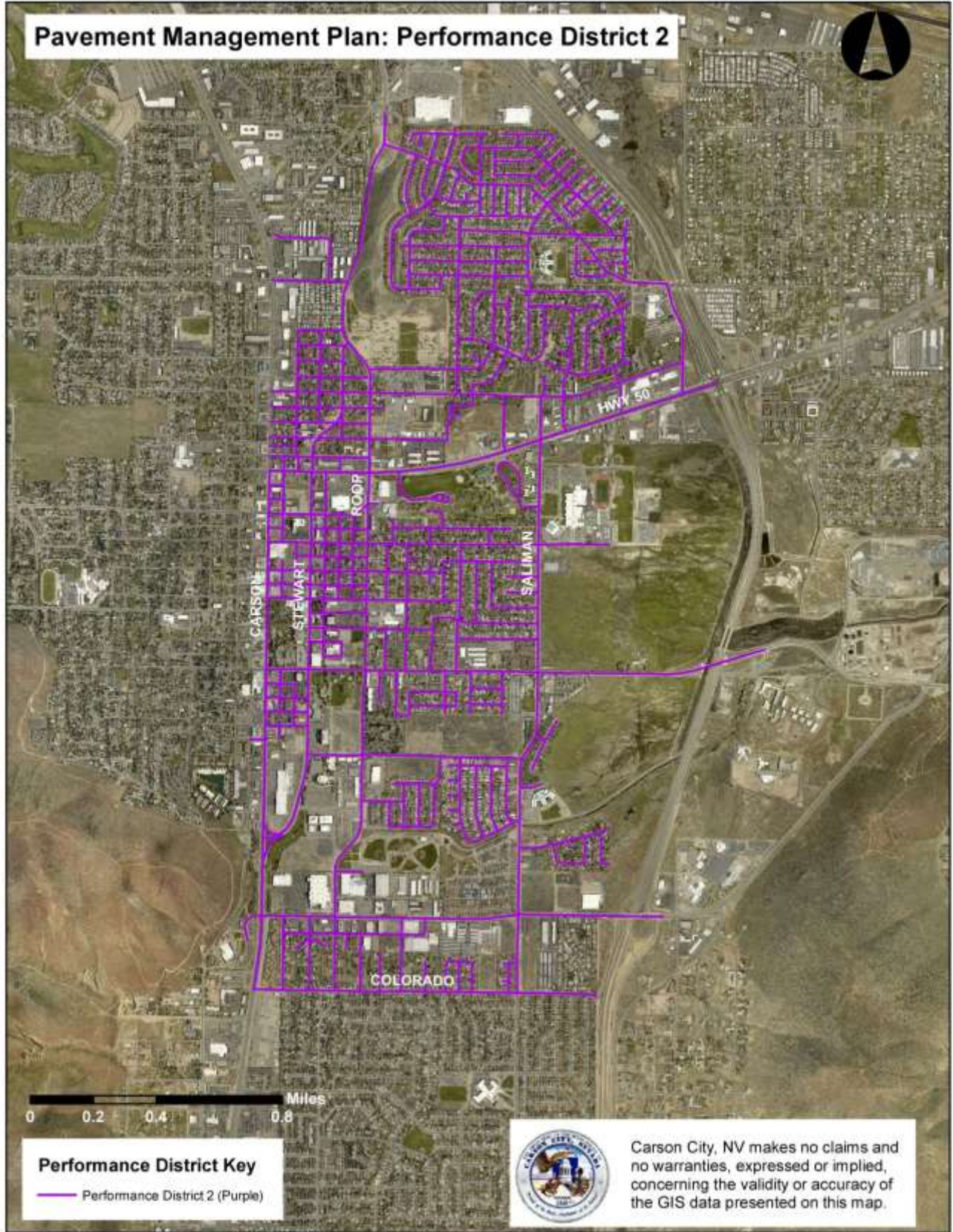
Appendix C – Performance District Maps



Pavement Management Plan: Performance District 1



Pavement Management Plan: Performance District 2



Performance District Key
— Performance District 2 (Purple)



Carson City, NV makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.



Pavement Management Plan: Performance District 3



Pavement Management Plan: Performance District 4



Performance District Key

— Performance District 4 (Orange)



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Pavement Management Plan: Performance District 5

