



**CITY OF CHESTERFIELD
PLANNING AND PUBLIC WORKS COMMITTEE MEETING**

**THURSDAY, AUGUST 6, 2026
5:30 P.M.**

CONFERENCE ROOM 101

I. APPROVAL OF MEETING SUMMARY

A. Approval of the July 23, 2026 Planning and Public Works Committee Meeting Summary

II. UNFINISHED BUSINESS

III. NEW BUSINESS

A. 2026 Wildhorse Village Snow Removal Services

B. 2026 Arterial Road Resolution

C. 2026 Concrete Pavement Manual

IV. OTHER

V. ADJOURNMENT

Note: The Planning and Public Works Committee will consider and act upon the matters listed above, and such other matters as may be presented at the meeting and determined to be appropriate for discussion at that time.

PERSONS REQUIRING AN ACCOMMODATION TO ATTEND AND PARTICIPATE IN THE PLANNING & PUBLIC WORKS COMMITTEE MEETING SHOULD CONTACT CITY CLERK VICKIE MCGOWND (636)537-6716 AT LEAST TWO (2) WORKDAYS PRIOR TO THE MEETING.



I.A

RECORD OF PROCEEDING

MEETING OF THE PLANNING AND PUBLIC WORKS COMMITTEE CHESTERFIELD CITY HALL 690 CHESTERFIELD PARKWAY WEST CONFERENCE ROOM 101

July 23, 2026

Chairperson Koch called the meeting to order at 5:30 p.m.

PRESENT

Council Committee Member A.J. Moll, Ward I
Council Committee Member Mary Ann Mastorakos, Ward II
Councilmember Pat Tocco, Ward II
Council Committee Member Lane Koch, Ward III
Council Committee Member Merrell Hansen, Ward IV
Justin Wyse, Director of Planning
Isaak Simmers, Planner
Shane Streiler, Planner
Theresa Barnicle, Executive Assistant/Recording Secretary

ABSENT

APPROVAL OF MINUTES

Councilmember Mastorakos made a motion, seconded by Councilmember Hansen, to approve the July 9, 2026 Planning and Public Works Committee Meeting Minutes. A vote was taken with a unanimous affirmative result (4-0), and the motion was declared passed.

UNFINISHED BUSINESS

P.Z. 01-2026 City of Chesterfield (Unified Development Code - Article 4, Attachment 4)

This item was moved to be the second item discussed with consensus of the Committee.

The committee conducted a comprehensive review of proposed amendments to Article 4, Attachment 4 of the Unified Development Code (UDC) to establish site and building design standards for outdoor storage and display areas, with particular attention to automobile dealerships.

Planner Isaak Simmers outlined the discussion around several guiding questions, including how to provide design flexibility while maintaining high-quality development, ensure intentional and effective screening, regulate visibility from multiple viewpoints, and focus regulations on visual impacts rather than specific land uses. Three levels of screening were presented for consideration—landscape buffers, fully screened enclosures, and combined fencing and landscaping. Committee members generally favored approaches that balance flexibility with attractive, year-round screening.

The committee discussed several aspects of site design, including access, storage placement, and landscaping. Members emphasized that access standards should address multimodal transportation connecting walking, biking, and public transit in addition to vehicles and should apply to both primary developments and outdoor storage areas. Considerable discussion centered on the use of subjective language such as “where feasible” and “minimize visual impact,” with members expressing a preference for more prescriptive regulations while still allowing flexibility for site-specific conditions.

The committee also noted that design requirements should reflect surrounding land uses, particularly where commercial properties abut residential neighborhoods, and confirmed that the more restrictive design standards would apply in those situations.

Landscaping and screening generated significant discussion, with members supporting requirements that created attractive year-round appearances and encouraged the use of native plantings for their environmental benefits and reduced maintenance needs. The committee also expressed strong support for discouraging or prohibiting vinyl fencing in commercial settings due to durability concerns, instead favoring wood, metal, or masonry materials while allowing exceptions when justified.

Committee members further highlighted ongoing issues with trash enclosures that are screened but routinely left open, undermining their purpose. Staff acknowledged the enforcement challenges associated with these violations and agreed to coordinate with the enforcement team to explore policy improvements and stronger compliance measures.

The committee devoted substantial attention to automobile dealership operations, particularly the need for clearer standards governing outdoor vehicle storage. Members discussed limiting inventory to approved site plan areas, prohibiting tandem parking practices and requiring distinct areas for customer parking, employee parking, vehicle inventory, and service vehicles. They noted that a site plan that clearly sets a limit, capacity, or designated

area for such land uses would improve enforcement by making violations more apparent.

Throughout the discussion, the committee recognized that the City's development standards have evolved as available land has diminished, shifting the focus toward preserving community character, preventing visual impacts, and responding to resident concerns about overdevelopment while maintaining an environment that remains attractive for investment.

To advance the amendments, staff was directed to prepare a revised redline draft of the UDC, incorporating feedback into the discussed items. The committee consented on reconvening for the remaining items at a future meeting, and no motion was necessary at this time.

NEW BUSINESS

Proposed 2027 Planning and Public Works Meeting Schedule

This item was discussed last.

Director of Planning Justin Wyse noted to the committee that the proposed 2027 schedule is properly aligned with City Council meetings to minimize delays in moving items forward to City Council. General discussion was held with the committee supporting the schedule.

Councilmember Koch made a motion, seconded by Councilmember Hansen, to approve the Planning and Public Works 2027 Meeting Schedule. A vote was taken with a unanimous affirmative result (4–0), and the motion was declared passed.

P.Z. 05-2026 357 North Woods Mill Road

This item was moved to be the first item discussed with general consensus of the committee.

The Planning and Public Works Committee reviewed a request to rezone a 0.92-acre property at 357 North Woods Mill Road from “NU” Non-Urban to “R4” Residential to facilitate the redevelopment of the existing Orthodox Jewish education center into an adult day care center.

Planner Shane Streiler provided a history of the site, noting that it originally served as a firehouse before Parkway Central High School was built nearby, with part of the school's parking lot extending onto the property. The site was zoned “NU” Non-Urban by St. Louis County in 1965, later redeveloped into an educational center in the late 1990s, and has remained largely unchanged since. Mr. Streiler explained that the rezoning is necessary because the current NU district requires a minimum three-acre site for a day care facility, while the subject property is less than one acre. The applicant selected the “R4” Residential district over “R2” or “R3” because its standards are more

compatible with the proposed use and the property's location along an arterial roadway.

Mr. Streiler noted that the Planning Commission had already recommended approval by an 8-1 vote following a public hearing. He went on to explain if City Council approved the rezoning, the applicant must still obtain a conditional use permit for the adult day care center and later receive approval of a revised site plan through the Architectural Review Board and Planning Commission.

Committee members asked what could occur if the conditional use permit were denied. It was explained that the property could instead be developed for uses permitted in the “R4” district, primarily single-family detached homes, although practical site constraints would likely make construction of five homes—the theoretical maximum based on lot size—unlikely. Mr. Streiler indicated that the property's size, street frontage requirements, and surrounding development make low-intensity uses, such as a day care center or place of worship, the most realistic long-term options.

Committee members also discussed the proposed 2,500-square-foot, single-story building addition and its impact on parking. Staff explained that the addition would be constructed behind the existing building, reducing the parking lot from approximately 38 spaces to 26 spaces. Despite the reduction, the revised parking layout would comply with the City's off-street parking requirements because the existing lot currently exceeds the maximum number of spaces permitted. Staff noted that the parking lot would be fully evaluated during the site plan review process if the rezoning and conditional use permit are approved.

Overall, committee members expressed support for the proposed “R4” zoning, finding it appropriate for the site's location and intended use while recognizing that additional project approvals would still be required before redevelopment could proceed.

Councilmember Hansen made a motion seconded by Councilmember Moll, to forward P.Z. 05-2026 357 North Woods Mill Road to City Council with a recommendation to approve as presented. A vote was taken with a unanimous affirmative result (4–0), and the motion was declared passed.

ADJOURNMENT

The meeting was adjourned at 7:10 p.m.

Respectfully submitted:

Justin Wyse
Director of Planning

Theresa Barnicle
Executive Assistant

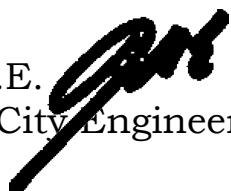
Date Approved: _____

Memorandum

Department of Public Works



TO: Michael O. Geisel, P.E.
City Administrator

FROM: James A. Eckrich, P.E. 
Public Works Dir. / City Engineer

DATE: July 29, 2026

RE: Wildhorse Village Snow Removal Services

As you know, for some time we have been preparing for the streets in Wildhorse Village to be turned over to the City of Chesterfield for public acceptance. Once that occurs, we will need to provide snow removal services. Because these streets differ substantively from our typical single-family residential streets and because the services in this area are funded through a Special Business District (SBD) it is my intention to contract for snow removal services in Wildhorse Village. Accordingly, on May 22, 2026 the Department of Public Works issued a Request for Proposals (RFP) for snow removal services in Wildhorse Village. Five contractors submitted proposals, with BSR services submitting the best proposal at the lowest price. Based upon this proposal, I have negotiated a contract with BSR. It is noteworthy that BSR is the contractor currently providing services for Wildhorse Village, so they are very familiar with the services required.

You will recall that at the July 20, 2026 City Council meeting the City Council approved a Memorandum of Understanding (MOU) for Lot 6 – Waterfront at Wildhorse Village (Waterfront). That MOU details that Waterfront will contract for its own snow removal services and submit to the City for reimbursement through the SBD. Accordingly, Lot 6 (Waterfront) is not included in the scope of services for this contract. Lot 1 is also not included in this scope of services as we do not expect to accept the streets in Lot 1 until a later time. The streets covered by this contract are shown on Page 2.

While the streets in Wildhorse Village have not been accepted as public yet, it is expected that that will occur prior to the end of the year. Accordingly, it is imperative that arrangements are in place to be prepared for snow removal. It is simply not practical to secure a contractor and draft/approve a contract in the middle of the snow season. The contractor needs to prepare for the service he will provide and secure the necessary equipment and labor force.



I want to be clear that the snow removal services to be provided as part of this contract will be similar to those throughout the rest of the City. While the configuration of these streets differ substantially from our conventional streets and lead to significant challenges for snow removal, the outcome will be the same. We will make the streets as safe and passable as reasonably possible. That said, we will NOT remove snow from sidewalks, trails, or other facilities. If Wildhorse Village desires those additional services they will have to fund those separately – outside the SBD - similar to Waterfront.

Because these snow removal services will be funded through the SBD and outside the City budget, the City Council does NOT need to approve this financial allocation in the conventional manner. Nevertheless, City Council does need to authorize execution of a contract with BSR for snow removal services. This contract will include an estimated cost for snow removal services of \$50,000, to be paid through the SBD. However, if additional costs are necessary those will be authorized by the City's Project Manager and paid through the SBD.

Please note that negotiations for the acceptance of the streets in Wildhorse Village are ongoing. The City fully expects that these streets will be accepted as public prior to the end of 2026. However, in the case that the streets are not accepted, our negotiations with Wildhorse Village will contain safeguards that protect the City while ensuring that the residents in this area receive the necessary snow removal services.

Action Recommended

This matter should be forwarded to the Planning and Public Works Committee of City Council. Should PPW support the recommendation of the Director of Public Works, it should recommend approval of contract with BSR services for snow removal services in Wildhorse Village. Should City Council concur with Staff's recommendation, it should authorize the City Administrator to execute the contract between the City of Chesterfield and BSR Services.

Concurrence:


Justin Wyse, Director of Planning

Well done, a lot of effort has gone into making this happen and serving the residents of Wildhorse Village. Thank you!

 **2026-7-29**

Snow & Ice Management Strategic Partnership



Superior Winter Risk Management

Presented to:



Submitted by:

Shelby Bunge
BSR Services, Inc.
sbunge@bsrservices.com
c: 314-471-3875

June 23, 2026

Superior Winter Risk Management



Thank you for the opportunity to provide pricing for snow and ice management for Downtown Chesterfield – Wildhorse Village Subdivision for the 2026/2027 winter season. Addendums 1 - 3 have been reviewed. Please find enclosed information about our company and our proposal.

BSR Services is the largest locally owned 'snow only' services provider in St. Louis and has been providing snow and ice management for over 40 years. BSR specializes in serving clients who manage commercial real estate environments, municipalities such as the City of St. Louis, Lambert Airport, Southwest Airlines, Missouri American Water, among many others. BSR has serviced Wildhorse Village, including the roadway, since the development's inception and is well positioned to provide exceptional snow services to The City of Chesterfield.

We want your business and welcome the opportunity to provide snow and ice management services to The City of Chesterfield.

Sincerely,

Carl Bolm, CSP
President



ISO Certified
SN 9001

Largest Snow-Specific Fleet
In The St. Louis Area

SUPERIOR WINTER RISK MANAGEMENT

Company Information

BSR Services, Inc.

2451 Schuetz Rd.

Maryland Heights, MO 63043

Shelby Bunge - Business Development Manager – 314-471-3875 – sbunge@bsrservices.com

Chris McLean – Director of Operations – 314-249-6683 – cmclean@bsrservices.com

Company Background

- Founded in 1984 by Carl Bolm, he started with one plow truck and 40 years later has grown into the largest “snow-only” company in the St. Louis area that focuses on commercial property snow and ice management. Clients include City of St. Louis, Lambert Airport, Southwest Airlines, Missouri American Water Company, Edward Jones Headquarters, Mercy, among many others.
- BSR maintains the largest fleet of snow-only trucks and assorted snow-specific equipment in St. Louis to handle every job along with more than 400 team members. Fleet includes: snow plows, salt trucks, backhoes, ATVs, skid steers, wheel loaders, and more than 100 containment snow pushers. Our team members and fleet allow us to self-perform services.
- BSR staff carries certifications from Accredited Snow Contractors Association (ASCA), Certified Snow Professionals (CSP) and Advanced Snow Managers (ASM) through the Snow and Ice Management Association (SIMA).
- BSR was the first company in the Midwest and the second in the nation to earn ISO 9001/SN9001 certification. BSR remains the only snow contractor in the St. Louis area to carry an ISO certification. ISO certification is a standard to establish requirements for the implementation of a quality management system (QMS) for the professional snow and ice management industry.
- BSR also carries an ISN Certification which requires that we meet rigorous standards for safety, insurance, and regulatory compliance.
- Our 60,000 sq.ft. centrally located facility and multiple chemical depots allow for rapid response during inclement weather.
- BSR notifies clients via email and text 72 hours out from the start of a forecasted weather event detailing the weather forecast and services. Constant communication throughout the event includes information pertaining to site conditions, snow and ice removal services, and weather forecasts.
- Services include pre-treatment with ice-melting products, plowing, snow hauling and post-treatment/refreeze service to keep properties safe and functional.
- BSR tracks crews and equipment in real time through GPS during the event to ensure services are completed timely.



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Operational Plan

Once impending inclement weather is in the forecast, we will dispatch a salt/brine truck to do a pretreatment of the roadways. Since we also service the Wildhorse Village HOA we will have assets mobilized and on site as warranted prior to the start of and throughout the weather event. That will include a salt/brine truck and a plow truck to clear the roadways as needed with accumulating snow. The roadway crews will work in tandem with our sidewalk crews that service the HOA to ensure service areas are clear and passable. Once the event has ended, if temperatures warrant refreeze service, we will have a salt/brine truck dispatched as conditions warrant. The property will have a Quality Assurance Manager assigned to oversee and ensure quality and completion of services. The QA manager inspects the property frequently throughout the duration of the event.

BSR has a customer hotline that is answered 24/7 during a weather event for general inquiries. For immediate needs a Quality Assurance manager will be available to contact. All contact information will be provided prior to the season.

BSR purchases all rock salt and materials through long standing vendor relationships prior to the start of and throughout the season and is well positioned to have ample supply to treat the roadways.

Environmental Plan and Practices

Salt Storage

- Store salt in a covered, contained area with an impermeable surface.
- Keep storage areas away from drains and drainage channels.

Salt Application

- Use calibrated spreaders and apply only the amount necessary for conditions.
- Monitor weather forecasts to avoid over-application.
- Prevent salt from being spread into landscaped areas or storm drains.
- Use liquid brine when conditions allow

Training and Inspections

- Train employees annually on proper salt handling and application.
- Conduct periodic inspections of storage areas, equipment.

Recordkeeping

- Salt purchase and usage logs
- Employee training records
- Equipment calibration



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SUPERIOR WINTER RISK MANAGEMENT

References

Property Manager for Wildhorse Village
Luke Hesse
luke.hesse@cushwake.com - 636-214-4010

City of St. Louis
Marcus Ray
raymar@stlouis-mo.gov - 719-571-0033

Lambert Airport
Cole Meyer
cdmeyer@flystl.com - 314-566-0471

Mike Vasseur
Southwest Airlines
michael.vasseur@wnco.com - 720-284-7438

Edward Jones Headquarters
Bryan Casteel
bryan.casteel@edwardjones.com - 314.515.9120



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Client Testimonials

From: Shumway, Adrienne <Adrienne.Shumway@Mercy.Net>
Sent: Thursday, February 20, 2025 4:34 PM
To: Carl Bolm <CBolm@bsrservices.com>
Cc: Shelby Bunge <sbunge@bsrservices.com>
Subject: RE: Mercy Virtual Care Center, 15740 S Outer 40 Road, Chesterfield, MO

Carl and Shelby,

I was on a call last week and was told Rachel hired BSR for several of her properties. I heard very nice things about you all. They were very happy they made the switch to BSR and thanked me for the recommendation.

Great job! I'm sure you all are exhausted from this last event. Hang in there. Thank you for everything you do.

Adrienne Shumway
Manager – Property Operations
Real Estate Management

Mercy
15740 S. Outer Forty Road | Chesterfield, MO 63017
Office: 636.237.4070

From: Shumway, Adrienne
Sent: Thursday, January 9, 2025 1:06 PM
To: Carl Bolm <CBolm@bsrservices.com>
Cc: Shelby Bunge <sbunge@bsrservices.com>
Subject: RE: Mercy Virtual Care Center, 15740 S Outer 40 Road, Chesterfield, MO

Carl,

Ya'll are the BEST! I appreciate everything you do for us. Stay safe tonight and tomorrow.

Thanks,
Adrienne Shumway
Manager – Property Operations
Real Estate Management

Mercy
15740 S. Outer Forty Road | Chesterfield, MO 63017
Office: 636.237.4070



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Client Testimonials - continued

From: "Casteel,Bryan" <Bryan.Casteel@edwardjones.com>

Date: September 4, 2024 at 4:58:51 PM CDT

To: "Sterling, Jenifer" <JSterling@stlouiscountymo.gov>

Subject: RE: Reference Request for BSR Services Inc from St Louis County

Hi Jenifer – Please see the below in red.

I would like to state that BSR ownership did not preemptively contact me of your inquiry below. What I express below is my honest, non-biased opinion of my experience with them over the past decade +. You would not go wrong with hiring/bringing BSR on board for your needs.

Please let me know of any other questions.

Thank you,

Bryan Casteel

Senior Facilities Manager

Edward Jones

201 Progress Parkway

St. Louis, MO 63043

P: 314-515-9120

From: Sterling, Jenifer <JSterling@stlouiscountymo.gov>

Sent: Friday, August 30, 2024 3:42 PM

To: Casteel,Bryan <Bryan.Casteel@edwardjones.com>

Subject: Reference Request for BSR Services Inc from St Louis County

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Mr. Casteel,

BSR Services, Inc. has listed you as a reference. Please reply to the three brief questions listed below via e-mail at your earliest convenience.



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Client Testimonials - continued

1. Did the reference conduct business with the bidder at any time within the past two years? **Yes. BSR has been a partner with my company and my client (Edward Jones) for many years, providing excellent service in their respective field. We are so impressed with their service, we signed a 5 year contract extension with them last year. BSR is the Cadillac of snow removal companies in the St. Louis metro area.**
2. Did the reference communicate with the bidder in person, by telephone or electronically? **All of the above. I have a close, working relationship with the owner and their support staff. We have multiple, in-person, on-site annual meetings. Additionally during snow season, we communicate constantly via email and text/phone call. They are always extremely responsive, handle our needs swiftly and treat us like we are their only client. I would HIGHLY recommend BSR to any company in the area needing their services.**
3. Did the bidder meet the requirement that they were hired for? **Yes. Not only do they deliver what they promise, but they always exceed our expectations by going the extra mile with their teams on our properties to make the property safe for foot and vehicle traffic during inclement weather.**

Thank you.

Respectfully,



Jenifer Sterling

Office Service Representative, Procurement
Saint Louis County
41 South Central Ave | Clayton, MO 63105
o: 314.615.7120
stlouiscountymo.gov

Opportunity Central

Superior Winter Risk Management



Why BSR Services

BSR Services is your complete commercial snow and ice management company. We combine our solid industry reputation with a comprehensive snow safety approach to give you **superior service with results you can trust**. We are your winter specialists when it comes to quality performance, cost- effective methods, and maximum customer satisfaction.

Built to Provide Superior Service



35+ Years of Snow & Ice Management Specializing in Class A & Medical Facilities



Largest Dedicated Fleet in the St. Louis Area with 50+ Trucks & Equipment



60,000 sq ft Facility with Multiple Chemical Depots for Rapid Response



Smart Technology
Hi-tech Fleet Deployment System



Eco Friendly Promise
Environmentally Friendly Materials



Fiscally Responsible Partnership
and Accurate Invoicing Brings Peace of Mind

Dedicated to Excellence

Awards, Certifications and Recognition Includes:

- First Midwest company, and second in the nation, to earn **ISO 9001/SN9001 Certification**
- Three time recipient **SIMA Excellence in Business**
- Management team are **Certified Snow Professionals (CSP)** and **Advanced Snow Managers (ASM)**
- **Snow Magazine Leadership Award**
- **Innovative Leadership Award and Public Service Award** from Maryland Heights
- **SIMA Environmental Leader of the Year**
- **SIMA Philanthropic Award**

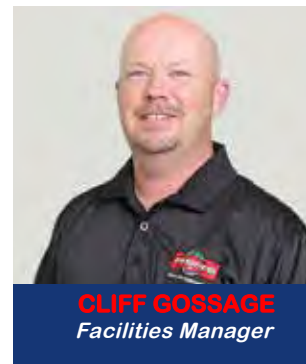
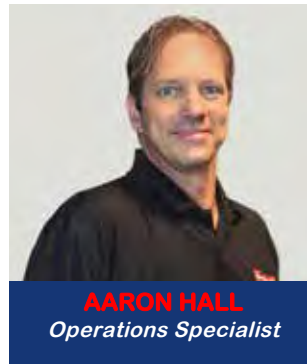
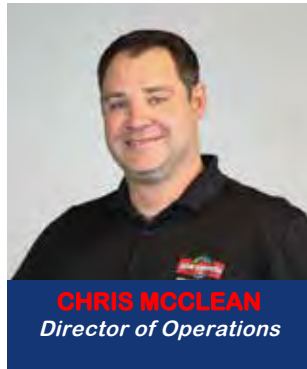


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We Are #BSRstrong

BSR strong embodies who we are and the culture we strive for at BSR Services. Culture is the force that motivates and retains talented team members. We are constantly evolving and changing to make sure our team members can give our clients the best service possible. We attract the kind of team members we want to have; strong, passionate, and resilient solution providers. Our team members become a part of our family.



We are proud of our hundreds of supporting team members and strategic partners that make us **#BSRstrong**

Scan to
Learn More



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Safety and Winter Risk Management

We are on call **24 hours a day, 7 days a week, 365 days a year**. Our team is always monitoring the weather so you don't have to. We take the worry out of the winter. With three private weather services, we have access to multiple meteorologists any time day or night.



BSR Service's safety record is top in the midwest. This is why:

- Ongoing team member training programs focus on safety, best practices and incident prevention.
- Clients' individual needs are mapped out, including priorities, snow routes, hours of operations and how to prevent "slip and falls".
- Quality Assurance managers are dedicated to overseeing all properties in their zone and ensuring excellence in service and safety.

Environmentally Friendly Practices

We at BSR Services are always looking for the best snow and ice removal methods to better serve you. A few years ago we invested in new equipment – including state-of-the-art liquid salt application machinery, two tanker trucks, and the addition of liquid systems to our remaining 50 trucks – in order to offer **faster and more environmentally-friendly winter treatment methods**. Now we're expanding this type of treatment to encompass even more of our winter service programs.



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Always Be In the Know...

We believe that the best service is accompanied by superior results AND great communication. We strive to provide up-to-date storm information, service plans and summaries so that you always stay informed and empowered.



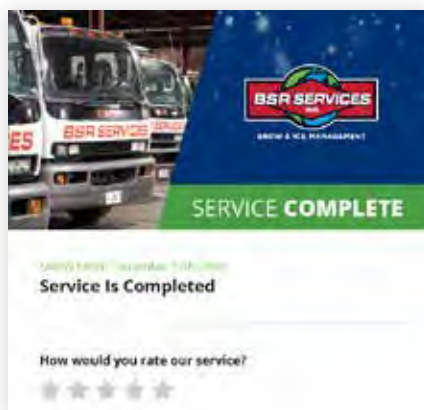
Weather Forecast Notifications

If inclement weather is on the way, you'll know! Consulting with three independent meteorologists allows us to send out forecast emails as soon as we learn of potential winter activity. We've been told by clients that they often tune into our emails instead of the local news for accurate information!



Service Plan Updates

Great service is guided by preparation, communication and excellent work. Throughout a storm, you'll receive service plan updates that let you know exactly what we're planning and why to ensure your facility stays safe and operations can run smoothly.



Service Complete Summaries

After each storm, we'll send service summaries that outline what was completed. We also want to know how the service was so we can continually improve your experience over time.

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BSR Services Team Member Training

BSR Service's safety record is top in the midwest.



Superior Winter Risk Management



Chemical Capabilities and Storage



Superior Winter Risk Management





SMITHERS
QUALITY ASSESSMENTS

CERTIFICATE OF APPROVAL

This is to Certify that the Quality Management System of:

BSR Services, Inc.

2451 Schuetz Road

Maryland Heights, MO 63043, USA

has been assessed and approved by Smithers Quality Assessments, Inc., to
the following Quality management system standards and requirements:

SN 9001:2016 with Design

The Quality Management System is Applicable to:

Snow and Ice Management Services.

Approval Certificate Number: 14.118.1

Original Approval: April 28, 2014

Current Certificate: April 23, 2026

Certificate Expires: April 22, 2029



*The use of the accreditation mark indicates
accreditation in respect of those activities
covered by the above certificate number.*

on behalf of SQA - J. Michael Hochschwender, CEO

The approval is subject to the company maintaining its system to the required standards which will be monitored by
Smithers Quality Assessments, Inc., 3637 Ridgewood Road, Fairlawn, Ohio, 44333, USA



Superior Winter Risk Management



BSR Services has gone through the rigorous process of becoming [ISO 9001 / SN 9001 certified](#). A third-party audit company has gone through all of our systems, policies, and procedures to ensure that our business management system meets the ISO 9001 and snow industry standards.

WHAT IS ISO 9001 / SN 9001 CERTIFICATION AND HOW DOES IT BENEFIT YOU?

SN 9001 is a newly created quality management system standard specific to professional snow contractors, and works in conjunction with the existing ISO 9001 standard. Businesses earn and maintain certification through a series of independent, third-party audits. These audits confirm the implementation of processes and procedures that adhere to the business and quality management standards for the professional snow and ice management industry.

Why is this important to you?

There are more than 30,000 slip and falls related to snow and ice each year. Of those, 35% of the claims are outright dismissed because the contractor can build a solid defense. Of the 65% of claims that are settled or lost, most of the time they are settled or lost due to a lack of proper documentation. One of the ways our clients benefit from this is that by managing our business in accordance with ISO 9001 and SN 9001 standards, it ensures that we have and maintain the necessary documentation to build a solid defense from a slip and fall claim. This adds yet another layer of risk management that our clients benefit from.

Your contractor may “do a good job”, but do they have and maintain the necessary documentation to help protect you? Will your defense simply be to say “they probably did a good job that day because they normally do...”? That has proven to fail as a defense in court! You need proper documentation!

Another way our clients benefit from our ISO 9001 certification is that we have a very well organized plan of how to give you a great experience, and we are held accountable to abide by that plan by a series of 3rd party audits. We are devoted to continual improvement, which means when something doesn't go as well as it should, we focus is on how to fix it, and then evaluate the fix to make sure it is an effective solution. This continual cycle of improvement pays off big for our team, our clients, and our vendors.

As a property owner or manager, don't you want a contractor on your property that has 3rd party verification that:

- They have the processes to ensure the job done right,
- Those processes are constantly evaluated for improvement,
- Is annually audited by a third party to ensure they are meeting your expectations, and
- They maintain the necessary documentation to build the best defense in a slip and fall case?

Certificate of ISNetworld® Membership



BSR Services, Inc

2451 Schuetz Rd | Maryland Heights, Missouri 63043

ISN ID Number: 400-861791

A member of ISNetworld since July 03, 2025



Joseph Eastin, EXECUTIVE CHAIRMAN & BOARD CHAIR

First Year
Subscriber



Brian Callahan, CEO & PRESIDENT



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

6/1/2026

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an **ADDITIONAL INSURED**, the policy(ies) must have **ADDITIONAL INSURED** provisions or be endorsed. If **SUBROGATION** IS **WAIVED**, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Marsh & McLennan Agency LLC company - St. Louis 825 Maryville Centre Dr. Suite 200 Chesterfield MO 63017	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2">CONTACT NAME: Corey Fox</td> </tr> <tr> <td>PHONE (A/C, No, Ext): 314-594-2503</td> <td>FAX (A/C, No): 888-307-1561</td> </tr> <tr> <td colspan="2">E-MAIL ADDRESS: Corey.Fox@MarshMMA.com</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="text-align: center;">INSURER(S) AFFORDING COVERAGE</th> <th style="text-align: center;">NAIC #</th> </tr> <tr> <td>INSURER A : NATIONAL UNION FIRE INSURANCE</td> <td style="text-align: center;">19445</td> </tr> <tr> <td>INSURER B : Travelers Property Casualty Co</td> <td style="text-align: center;">25674</td> </tr> <tr> <td>INSURER C :</td> <td></td> </tr> <tr> <td>INSURER D :</td> <td></td> </tr> <tr> <td>INSURER E :</td> <td></td> </tr> <tr> <td>INSURER F :</td> <td></td> </tr> </table>	CONTACT NAME: Corey Fox		PHONE (A/C, No, Ext): 314-594-2503	FAX (A/C, No): 888-307-1561	E-MAIL ADDRESS: Corey.Fox@MarshMMA.com		INSURER(S) AFFORDING COVERAGE	NAIC #	INSURER A : NATIONAL UNION FIRE INSURANCE	19445	INSURER B : Travelers Property Casualty Co	25674	INSURER C :		INSURER D :		INSURER E :		INSURER F :	
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COVERAGES**CERTIFICATE NUMBER:** 124445464**REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

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CERTIFICATE HOLDER**CANCELLATION**

	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE
--	--

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Attachment B

Snow Removal Rate Schedule & Fees

Provide this completed form along with all other requirements in section 8 of the RFP with your submission. Use blank spaces to provide any additional Labor, Equipment, or Materials

Fees	Rate	Units	
Seasonal Mobilization	\$0.00	Lump Sum	
Monthly Retainer	\$0.00	Per Month	
Per Event Mobilization Charge	\$400.00	Per Event	

TIME AND MATERIALS

The City will pay selected contractor on a time and materials basis. The contractor will invoice the City Based upon the following rates, which shall include overhead and profit.

	Rate	Units	
Labor			
Plow Truck Driver		Per Hour	
(See below for rate)			
Equipment			
Plow Truck (this includes driver)	\$110.00	Per Hour	
Skid Steer (for hauling)	\$110.00	Per Hour	
Dump Truck (for hauling)	\$100.00	Per Hour	
Material			
Rock Salt	\$150.00	Per Ton Placed	
Calcium Chloride	\$2.00	Per Gallon	

The City of Chesterfield understands and acknowledges that winter events will differ. Additional equipment and material may become necessary. Rates for labor/material/equipment outside that shown above will be negotiated with the selected contractor.

Please provide cost as if contractor will provide salt. City is willing to negotiate use of the City supply of salt.

RESOLUTION 52X

A RESOLUTION EXPRESSING OPPOSITION TO ANY PLANS FOR ST. LOUIS COUNTY TO RELINQUISH RESPONSIBILITY FOR ROADS THAT ST. LOUIS COUNTY HAS MADE PART OF THE COUNTY-ARTERIAL ROADWAY SYSTEM AND ST. LOUIS COUNTY'S ATTEMPTS TO UNILATERALLY IMPOSE THE BURDEN AND EXPENSE OF THESE ROADS ON MUNICIPALITIES BY REMOVING THEM FROM THE COUNTY-ARTERIAL ROADWAY SYSTEM

WHEREAS, the Revised Statutes of Missouri ("RSMo") Section 137.558 allows St. Louis County (the "County") to establish a "county-arterial road system" and designate roads as part of that system, without regard to municipal boundaries;

WHEREAS, the County has designated over 241 miles of roads located within St. Louis County municipalities, such as the Chesterfield Airport Road, as part of the "county-arterial road system" ("Municipal Arterial Roads");

WHEREAS, there are 62 municipalities from across the County that currently have at least one Municipal Arterial Roads within that municipality;

WHEREAS, within the City of Chesterfield (the "City"), the County has made approximately 36.9 miles of roads part of the "county-arterial road system" (the "Chesterfield Arterial Roads;")¹

WHEREAS, the County has asserted through litigation its exclusive authority and control over Municipal Arterial Roads, even though the Municipal Arterial Roads are located within the jurisdiction of a municipality without regard to municipal planning and zoning;

WHEREAS, the County has made maintenance, improvement, and access decisions for the Chesterfield Arterial Roads, and all Municipal Arterial Roads, regardless of the City's requests that the County prioritize traffic safety over the desires of property owners adjacent to Municipal Arterial Roads;

WHEREAS, the County's efforts to assert exclusive control over Municipal Arterial Roads have been a detriment to municipalities and resulted in a loss of control for municipalities over Municipal Arterial Roads;

¹ The Chesterfield Arterial Roads include including Baxter Road, Beechcraft Avenue, Bell Avenue, Buzz Westfall Drive, Chesterfield Airport Road, Chesterfield Parkway East, Chesterfield Parkway West, Clayton Road, Conway Road, Edison Avenue, Goddard Avenue, Kehrs Mill Road, North Beechcraft Avenue, North Bell Avenue, North Eatherton Road, North Outer Forty, North Woods Mill Road, Olive Street Road, Outlet Boulevard, Paul Haglin Drive, Premium Way, South Eatherton Road, South Woods Mill Road, Spirit Airpark East Drive, Spirit Airpark West Drive, Spirit of St. Louis Boulevard, Turbine Avenue, White Road, Wild Horse Creek Road, Wings Corporate Drive, and Wings of Hope Boulevard.

WHEREAS, the County has argued its exclusive control is necessary to ensure uniform standards and consistency, effective maintenance and repair, and mitigation of the County's liability exposure by not allowing municipalities any control over Municipal Arterial Roads;

WHEREAS, despite the County's efforts to prevent municipalities from having any control of Municipal Arterial Roads, the County has relied on the City to provide police services on Arterial Roads, including traffic regulation enforcement and responding to traffic accidents;

WHEREAS, as part of the County's control over traffic movement on the "county-arterial road system" for the last forty-five years, the County has shouldered the hefty expense of maintaining Municipal Arterial Roads;

WHEREAS, RSMo Chapter 137 provides the County with dedicated fundings mechanisms to pay for the expenses of the "county-arterial road system" including both tax and bond funding options;

WHEREAS, the City currently has financial, maintenance and improvement responsibilities associated with approximately 186 miles of roadways that are not part of the "county arterial road system", not Missouri State Highways, not Interstates, and not private roads (collectively "City Roads");

WHEREAS, if the City were to become responsible for the Chesterfield Arterial Roads in addition to the City Roads, then the City would be responsible for approximately 20% more miles of roadways than it currently has responsibility for;

WHEREAS, the City does not have the same funding mechanisms available to pay for the Chesterfield Arterial Roads as the County has and would be left with difficult decisions for how the City would fund the maintenance of the Chesterfield Arterial Roads if these roads were no longer part of the "county-arterial road system;"

WHEREAS, the County has no authority under RSMo Chapter 137 to unilaterally remove Municipal Arterial Roads from the "county-arterial road system" and thereby shift the financial, maintenance, and improvement responsibilities to the City or any other municipality;

WHEREAS, the County can only remove Municipal Arterial Roads from the "county-arterial road system," and thereby shift the responsibility for Municipal Arterial Roads, with the consent and agreement of the municipality or other entity who originally owned or controlled the Municipal Arterial Road;

WHEREAS, some Chesterfield Arterial Roads were never owned or controlled by the City, such as Chesterfield Airport Road being owned by the State of Missouri, and any agreement as to the future responsibility for such road would necessarily involve the entity who owned or controlled the road prior to said road being made a part of the “county-arterial road system;” and

WHEREAS, the governing bodies of municipalities who have Municipal Arterial Roads within their boundaries must be consulted before any plans are advanced that would remove a Municipal Arterial Road from the “county-arterial road system” and shift financial, maintenance, and improvement responsibilities for said Municipal Arterial Road to a municipality.

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City hereby opposes any and all plans for the County to relinquish responsibility for roads that have been designated as part of the “county-arterial road system” without the consent and agreement of the municipality in which said road exists; and

BE IT FURTHER RESOLVED that the City Council recognizes that other jurisdictions, such as the State of Missouri, may have an interest and/or responsibility for roads which the County has made a part of the “county-arterial road system;” and

BE IT FURTHER RESOLVED that the City Council urges the governing bodies of St. Louis County municipalities to pass a similar resolution opposing any and all plans for the County to take unilateral action with respect to the future of the “county-arterial road system” which would in any way increase a municipality’s financial, maintenance, and improvement responsibilities for roads which have been made a part of the “county-arterial road system.”

PASSED BY THE CITY COUNCIL OF CHESTERFIELD THIS ____ DAY OF _____, 2026.

Respectfully Submitted,

Presiding Officer

Dan Hurt, Mayor

Attest:

Vickie McGownd

Memorandum

Department of Public Works



TO: Michael O. Geisel, P.E.
City Administrator

FROM: James A. Eckrich, P.E. 
Public Works Dir. / City Engineer

DATE: July 29, 2026

RE: 2026 Concrete Pavement Report

As you know, in 2023 we began conducting an analysis of our concrete pavement in an attempt to quantify whether our financial planning and pavement management strategy are appropriate to maintain our significant concrete infrastructure. The result of this effort was the Concrete Pavement Report (Report), which was positively received by the Planning and Public Works Committee (PPW). At that time we determined that the Report should be updated each year and presented to PPW each year prior to budget deliberations.

The 2026 Report, which was originally completed and updated by Civil Engineer Anjana Kittu and Assistant City Engineer Zachary Wolff, does an excellent job of detailing our pavement infrastructure, the current condition of our pavement, and future condition of our pavement. While the document is very technical where necessary (such as the pavement deterioration curve of $y = -0.002x^3 + 0.0109x^2 - 0.2525x + 10$) it also effectively explains our concrete infrastructure planning in understandable terminology.

I am not going to attempt to duplicate the significant data contained in the Report within this memorandum. I highly encourage anyone receiving the Report to take the time to review it in detail. The big takeaway is that our concrete pavement infrastructure is aging (most pavement between 25 and 30 years old) and our overall pavement condition rating is decreasing over a ten-year period (from 8.13 in 2015 to 7.91 in 2025) but increasing since 2022 (from 7.82 to 7.91). The Report shows that the planned capital funding (\$4 million to \$5 million annually) is necessary, at a minimum, to maintain our overall infrastructure at its existing condition. Accordingly, it is imperative that funding designated for street replacement not be repurposed. Further, it is important that we continue to perform preventive street maintenance work to properly maintain our pavement and avoid high replacement costs until pavement has truly reached its end-of-life.

Our overall pavement network is in good to very good condition and will remain that way with the planned funding levels. But it is important to acknowledge that good to very good pavement is a baseline expectation of our residents. Accordingly, **sufficient capital funding for streets must be approved annually and not be reallocated for other purposes to ensure we can effectively address our streets and maintain them into the future.**

Similar to last year, I will provide a power point presentation of the Report at the next PPW meeting and will address any questions from PPW. I believe it would be appropriate to advise the full City Council of this presentation so that any non-members of PPW can attend if they so choose.

Action Recommended

This matter should be forwarded to the Planning and Public Works Committee of City Council, where it should be “received and filed.” No City Council action is necessary at this time. Should PPW require additional information related to our street infrastructure it should direct City Staff to conduct further work / research accordingly.

Excellent work! Please forward to PPW for their review and consideration.

 2026-7-29



City of Chesterfield

Concrete Pavement Report

July 2026

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1. Introduction and Purpose	3
2. Pavement Inventory, Inspections, and Ratings	3
3. Historical Pavement Condition and Spending	9
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Figure 2 – Road Mileage by Pavement Type

Figure 3 – Road Mileage by Classification

Figure 4 – PASER Rating and Condition Table

Figure 5 – Concrete Pavement Area (SY) by Age

Figure 6 – Concrete Pavement Area (SY) by PASER Rating

Figure 7 – Historic Spending on Pavement Repair versus Actual Rating

Figure 8 – Pavement Rating versus Age Condition Prediction Curve

Figure 9 – Budget versus Predicted Rating - \$4 Million Budget

Figure 10 – Budget versus Predicted Rating – 5-Year Plan

Tables

Table 1 – Historic Cost per Square Yard Comparison.

Appendices

Appendix A: Pavement Inventory Data

Appendix B: Street Classification Map

Appendix C: PASER Manual

Appendix D: Pavement Budget and Condition Prediction Spreadsheet

Executive Summary

This annual Concrete Pavement Manual focuses on the City's concrete roadways and aims to assist Staff with budgeting, project planning, maintenance prioritization, and long-term infrastructure preservation. This Report contains a detailed analysis of the City's concrete pavement inventory, inspection methodology, current conditions, historical performance, and future budget scenarios.

The City uses predictive modeling to estimate pavement lifespan and performance trends. Our current model shows that most concrete slabs reach a condition level that warrants replacement around a pavement age of 33 years. Routine maintenance activities such as joint sealing, partial depth repairs, and asphalt patching have proven effective in extending pavement life and deferring full replacements.

Historic spending and condition data show that over the past decade, despite ongoing maintenance, the City's overall concrete pavement condition declined slightly from 2013 to 2022. However, from 2022 to 2024 pavement ratings increased and then remained stable from 2024 to 2025 at an overall concrete pavement rating of 7.91. This turnaround highlights the importance of continued investment in replacement and maintenance and its direct impact on our pavement condition.

1. Introduction and Purpose

The City of Chesterfield's (City) pavement system includes approximately 186 miles of publicly maintained roadways, an increase from 184.3 miles in 2024. Figure 1 shows the growth of the City's pavement system over the years. The purpose of this Report is to provide an analysis of the City's concrete pavement system. The analysis will include the following sections: pavement inventory, inspections, and ratings (type, classification, age, condition, quantity); historical pavement condition and spending; pavement condition prediction; future budget scenarios and condition implications; and a summary. This Report is updated annually in advance of the City's annual budget process.

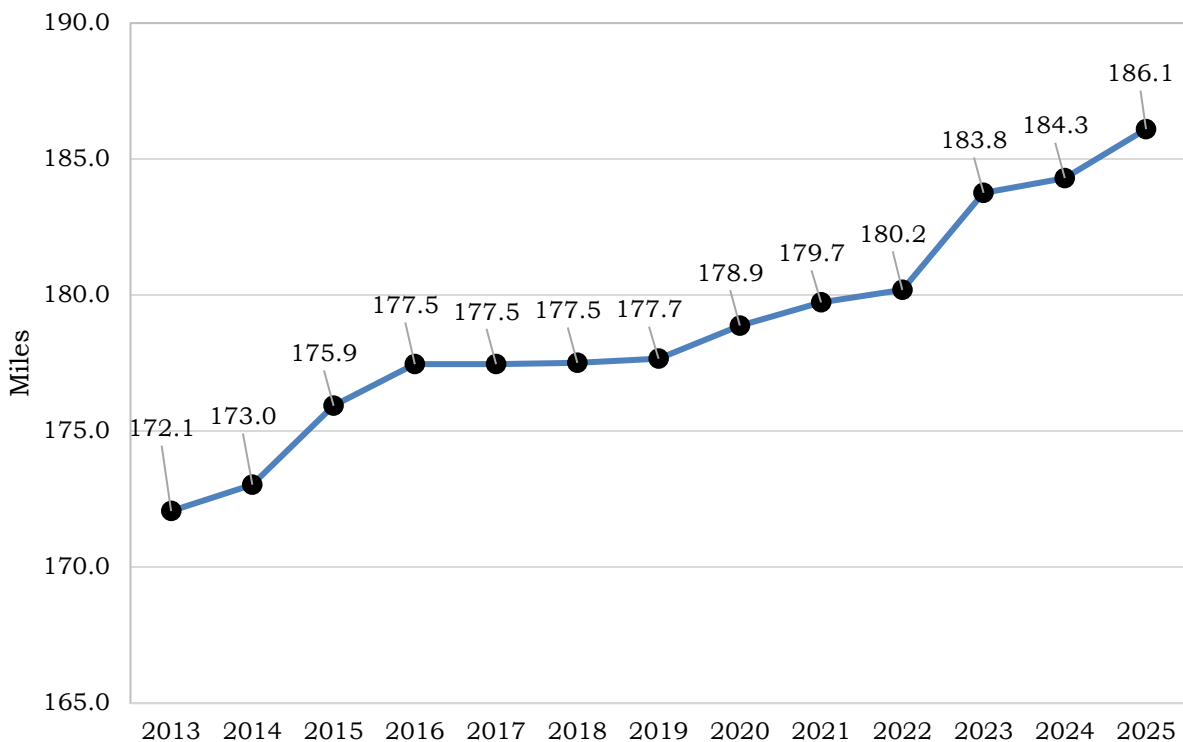


Figure 1

While some information on the City's asphalt pavement is included in this Report, the intent of this Report is to concentrate on our concrete pavement infrastructure. Complete information on the City's asphalt pavement system can be found in the Asphalt Pavement Maintenance and Inspection Manual, updated annually.

2. Pavement Inventory, Inspections, and Ratings

The City's pavement data is maintained by the GIS Division of the IT Department in collaboration with the Public Works Department. Appendix A includes a table of pertinent concrete pavement data that is updated annually. Most of the City's

pavement system, approximately 92% (172 miles), is concrete pavement. The remainder of the City's pavement system, approximately 8% (14 miles), is asphalt pavement. There is one small brick paver street segment on Appalachian Trail. As stated above, this Report will focus on concrete pavement.

Mileage of Roads by Pavement Type

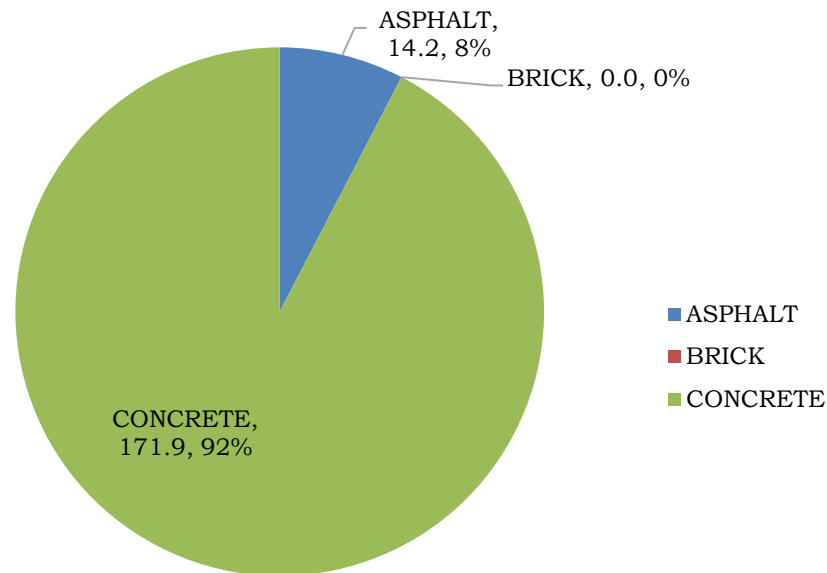


Figure 2

The City's roadways are classified into three categories: local, collector, and minor arterial. Local roads generally serve individual residences and include internal subdivision streets. Collector roads, as the name implies, collect traffic from local roads, provide connectivity into the arterial road system, and have fewer direct access points compared to local roads. Collector roads include Wildhorse Parkway, Greentrails Drive South, Burkhardt Place and Highcroft Drive. Minor arterial roads serve to efficiently move traffic through an area, typically with even fewer direct access points than collector roads. City maintained minor arterial roads are Edison Avenue, Ladue Road, and Schoettler Road. Figure 3 on the next page shows the current street classification and total miles of City streets in each category. The City's current Street Classification Map is included as Appendix B.

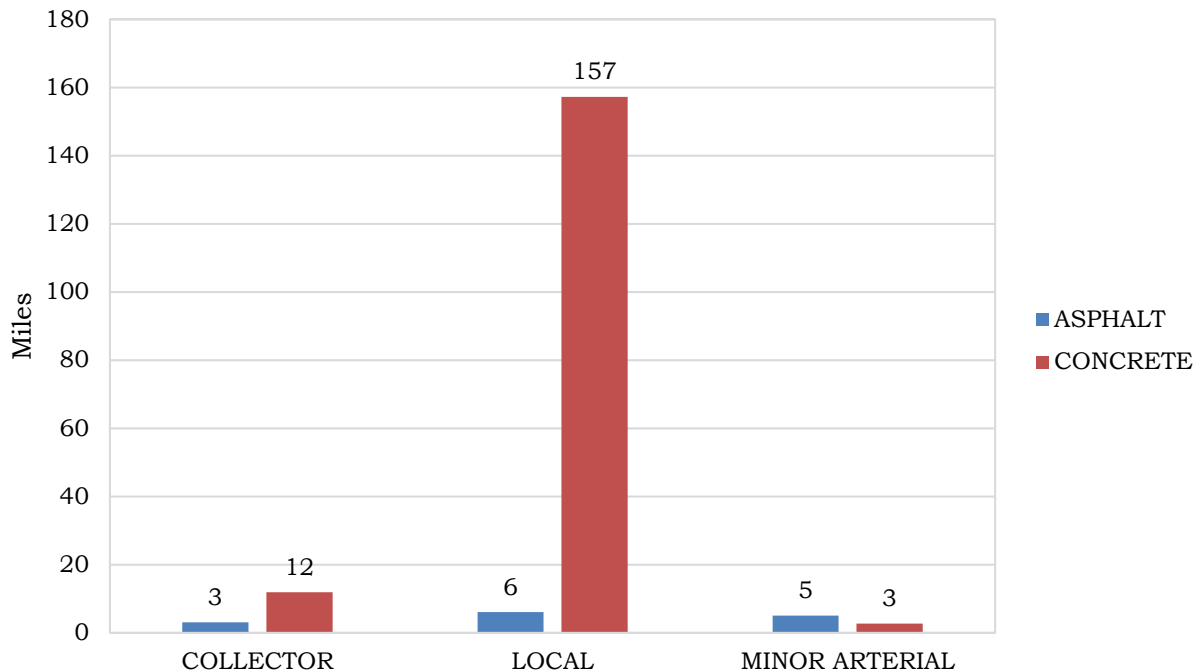


Figure 3

The City’s concrete pavement system is inspected and rated on a rolling three-year cycle such that over any three-year period the entire City is inspected. Pavement inventory and condition rating information are captured at the slab level; meaning that age and condition are specific to every individual concrete slab. The City’s pavement system includes 159,378 total unique slabs, up from 156,627 in 2025. Pavement condition ratings are conducted in accordance with the Pavement Surface Evaluation and Rating (PASER) Manual published by University of Wisconsin-Madison Transportation Information Center (Appendix C). The PASER system involves a visual evaluation of each slab by a City inspector who assesses surface defects, joints, pavement cracks, and pavement deformation to determine a condition rating from 10 (excellent) to 1 (failed). Figure 4 on Page 7 includes a summary of PASER ratings and the typical visual condition and/or defects that may be present in a concrete slab at each rating.

In accordance with the PASER rating system, pavement does not technically “fail” until it reaches a rating of 1. However, a concrete slab reaches the end of its useful service life long before reaching a rating of 1. For the City of Chesterfield’s purposes, slabs with a PASER rating of around 6 have significant defects that warrant consideration for slab replacement. As you can see from Figure 4, a rating of 6 indicates slabs broken into multiple sections with asphalt patches. A slab in this condition will typically generate complaints from area residents.

While the City assesses each slab individually, it would be impractical and ineffective to manage a pavement network on a slab-by-slab basis. Instead, a

group of slabs (typically a block from intersection to intersection) are incorporated into one street segment, and segment ratings are used to prioritize work. Generally, slabs within a segment deteriorate at a consistent rate. However, there are also instances where some slabs within a segment deteriorate quicker than others. In these cases, the City will generally attempt to maintain the deteriorated slabs and postpone their replacement until replacement of the entire segment is warranted. We will not perform large scale “postage stamp” slab replacement, as this will frequently damage good slabs adjacent to the replacement slab and create an endless cycle of replacement. This means that you cannot solely rely on segment ratings when prioritizing work, as one segment with a rating of 7.5 may contain consistent slabs while another section with a 7.5 rating may contain a group of slabs with ratings as high as 9 and as low as 5.

PASER Rating and Condition Table

<u>Rating</u>	<u>Visual Condition</u>
10	No cracks, asphalt patches or partial depth patches. No displacement, scaling or popouts. May have minor imperfections in the original pouring of the slab (e.g. rough edges from surface scrapes, rounded corners that show no sign of continuing wear.
9	The slab may have one minor hairline crack and no asphalt or partial depth patch. Minor imperfections are allowed such as minor scaling or few popouts. No raveling of the joints.
8	The slab may have one minor crack separating it into two pieces, but no displacement. May have partial depth patch in excellent condition, but no asphalt patches. Some minor scaling allowed or few popouts.
7	Slab may have one crack separating it into two pieces. Joints may have asphalt patching, but not more than 2" wide. May have partial depth patches in good condition. No patches inside the slab.
6	Slab is broken into 3 sections. Asphalt patches at the joints not more than 2" wide. May have partial depth patching in good condition.
5	Slab is cracked into more than 3 sections. Asphalt patches at the joints are more than 3" wide. Partial depth patches are failing.
4	Slab has patches that cover 30% of its surface. Joints are unraveled 3" or more.
3	Slab has asphalt or partial depth patches that cover 30-50% of its surface. Joints unraveling more than 3" wide. Cracked and displaced slab in need or repair.
2	Slab has asphalt or partial depth patches that cover over 50% of its surface. Slab is undermined or displaced. Severe deterioration of the joints and surface. The slab may create unsafe driving conditions.
1	Failed

Figure 4

Figure 5 below depicts the City's pavement area by age. Pavement age data is reviewed and updated annually. In an ideal situation, the City's pavement system would have a uniform age distribution across all age ranges which would allow for uniform replacement cycles and annual spending. However, due to a number of factors such a distribution is not realistic, and the City's actual pavement age information is shown below.

Concrete Slab Age Breakdown by Area

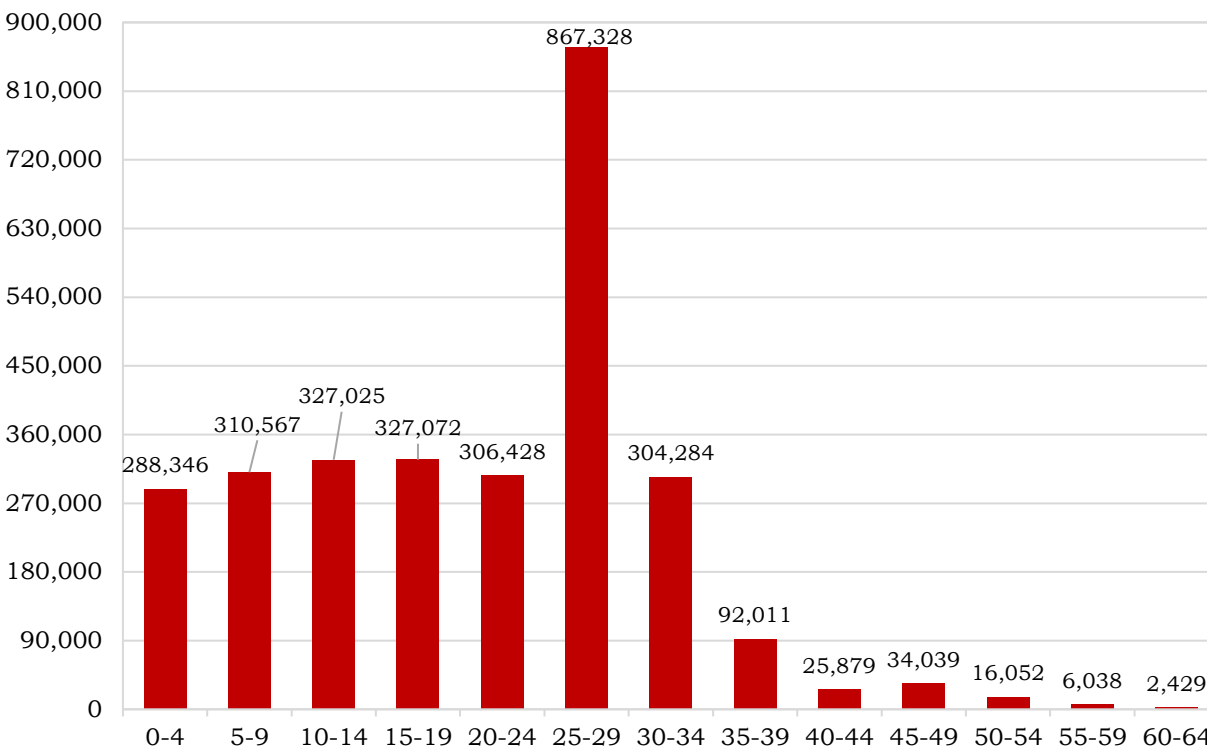


Figure 5

Figure 6 on page 9 shows the City's PASER ratings by pavement area. The City's total concrete pavement area is about 3.2 million square yards. Most of the City's pavement (~2.0 million square yards or about 70%) is rated an 8. A single concrete slab is approximately 15 to 20 square yards.

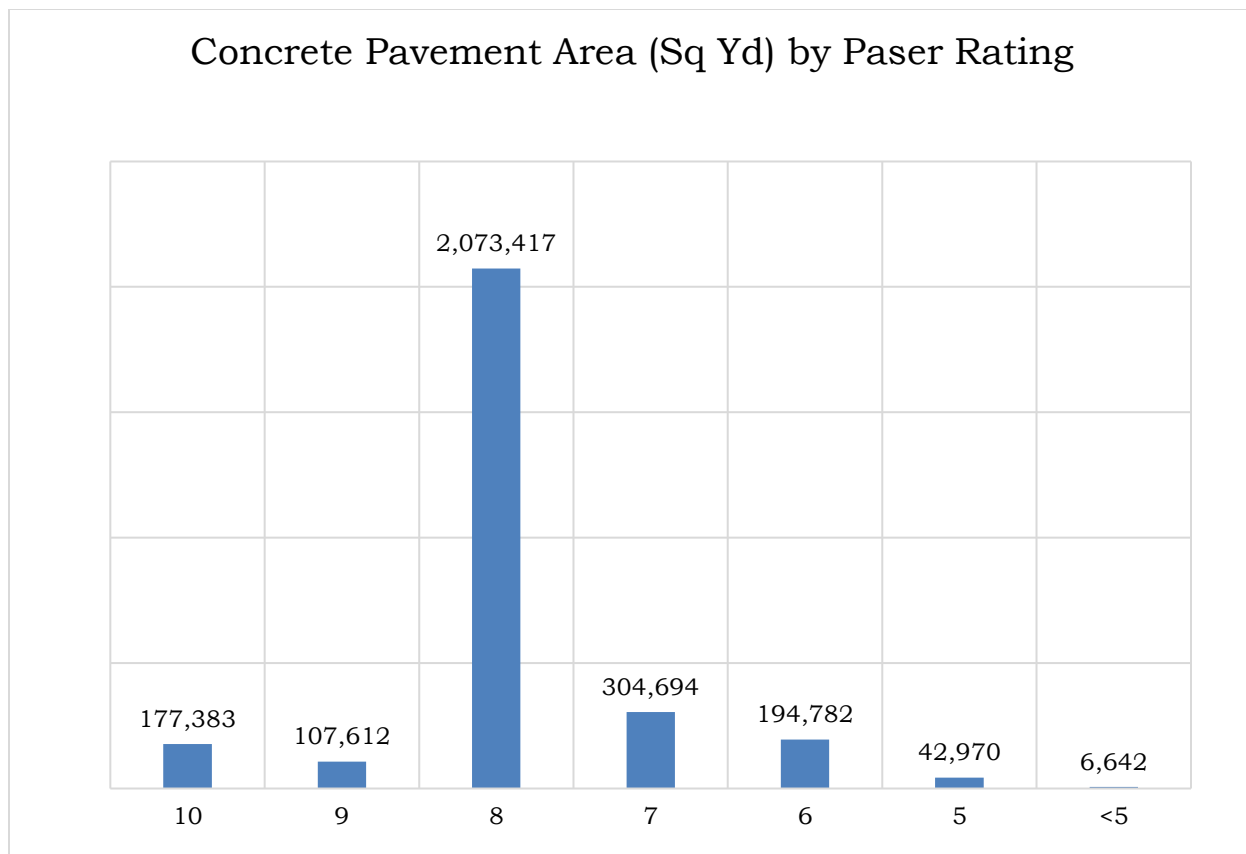


Figure 6

3. Historical Pavement Condition and Spending

Figure 7 on the following page shows the City's historic spending on capital pavement repairs and replacement, data points of the actual composite pavement ratings for each year, and a trendline of the ratings. You will note that spending varies year to year, in part due to grant funding and other City priorities, including sidewalk, trails, and facilities. City staff work to leverage available funding for reconstruction of collector and arterial roadways and sidewalks and adjust pavement repair spending accordingly. Completed grant projects include Ladue Road (2014), Appalachian Trail (2015), Greentrails Drive South (2016), and the Schoettler Road bridge (2017). Wilson Avenue (2026) is currently under construction. Upcoming grant funded construction projects include Schoettler Road Sidewalk (2027), Pathway on the Parkway (2027), and Highcroft Drive (2028). Note that spending on these types of grant projects (both the grant amount and the City match) have been excluded from Figure 7, specifically because these projects frequently include improvements other than pavement.

Over the past decade, the City has made significant efforts to maintain and replace its pavement network. From 2013 to 2022, the overall pavement

condition experienced a gradual decline — deteriorating by 0.37 points from 8.19 in 2013 to 7.82 in 2022, despite continued repairs and reconstructions. As shown in Figure 7, the general trendline remains downward, however the City has observed an improvement of the pavement network in recent years. The overall pavement rating increased from 7.82 in 2022 to 7.89 in 2023 and 7.91 in 2024, and remained at 7.91 in 2025. The stable rating reflects the City's continued commitment to timely pavement maintenance and replacement activities, which help preserve pavement condition and slow the rate of deterioration across the network. Continued investment and timely maintenance will be essential to build on this progress, maintain the stability of the rating, and avoid a future decline in the rating.

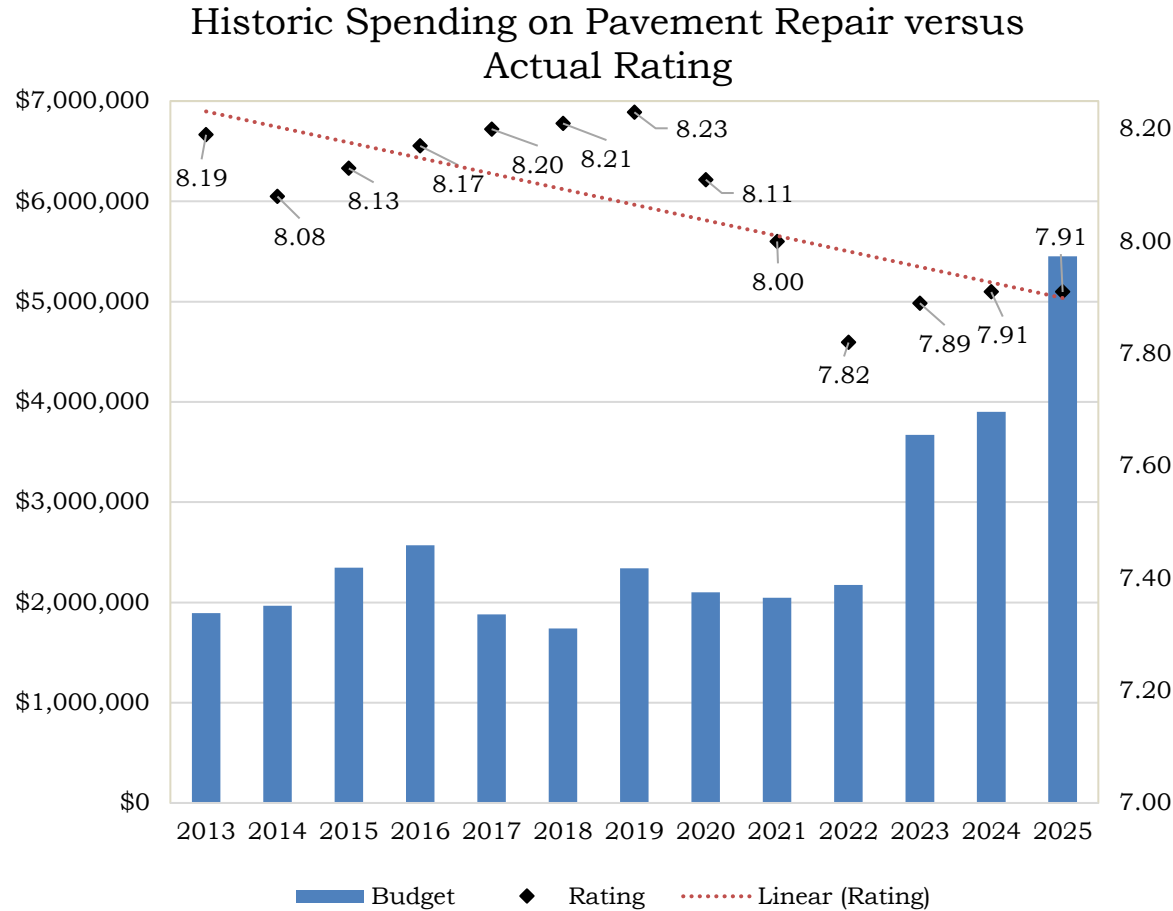


Figure 7

4. Pavement Condition Prediction

City Engineering Staff analyze historic pavement age and condition ratings to create a condition versus age curve specific to the City’s concrete pavement. Additional data is added annually to continually refine the condition versus age

curve. The City’s pavement condition data is based on a selection of representative concrete pavement with known age and condition ratings.

Figure 8 below shows the pavement deterioration curve for the City’s pavement. New pavement is rated a 10 and according to the current prediction curve it would normally deteriorate to a PASER rating of around 6 by year 33. As stated previously, a rating of 6 generally corresponds to the condition that residents find unacceptable. The equation in the top right portion of the chart is a polynomial regression reflecting the relationship between City’s pavement ratings (y) and pavement ages (x).

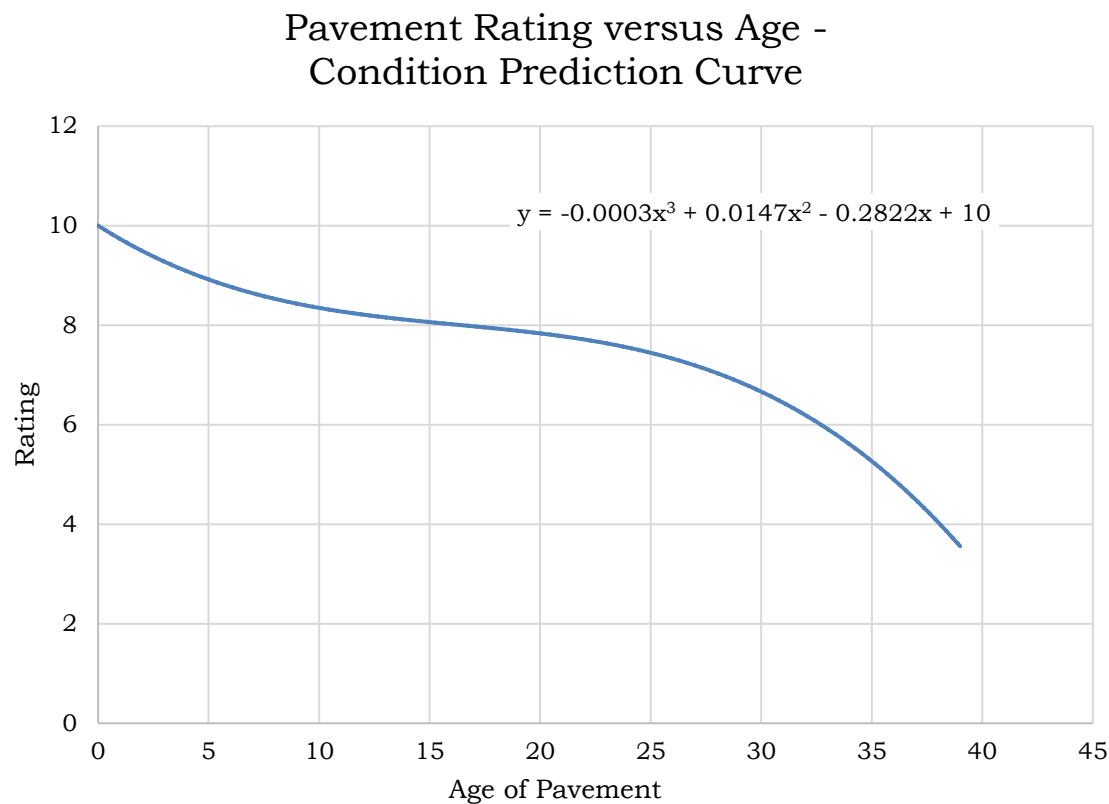


Figure 8

Conventional engineering practice holds that concrete pavement has an intended 30-year pavement design life. A pavement’s design life ends when it is no longer suitable for carrying traffic at a reasonable level of service. Every agency, municipality, and owner determines their reasonable level of service. Based on the City’s pavement data, it appears the City can reasonably expect slightly more than 30 years of life from most of its pavement. It is important to note that the City does not ignore pavement and allow it to deteriorate without any maintenance. Therefore, the City’s pavement ratings data inherently include all the City’s regular pavement maintenance activities including crack-sealing, partial depth repairs, asphalt joint repair, isolated slab repair, and asphalt

patches. These maintenance activities are strategically programmed with the goal of prolonging pavement life and minimizing overall deterioration to the greatest extent practical. The City's pavement rating versus age data and associated theoretical condition curve indicate the City's effort to prolong pavement life has been effective. It is important to schedule and conduct necessary repairs on time. Delaying necessary maintenance activities will have a long-term impact on our pavement system.

The serviceability of pavement should not be confused with resident or consumer satisfaction. Serviceability is an assessment of the pavement's performance at carrying the intended traffic loads at an acceptable condition. Consumer satisfaction is typically an assessment of the pavement's aesthetic appearance.

Replacing pavement based primarily on aesthetics, and not its performance, represents an inefficient use of limited capital funds. For example, if a ten-year-old street begins to experience joint deterioration, that joint deterioration can often be addressed with concrete joint partial depth repair (PDR) – which residents will typically accept. However, there are times that the deterioration is more severe, including pavement compromised by Alkali Silica Reaction (ASR) or Alkali Carbonate Reaction (ACR). In these cases, PDR will be ineffective, and the proper treatment is to construct asphalt joint repairs, to prolong serviceability. Unfortunately, many residents find the asphalt repairs aesthetically unacceptable resulting in low consumer satisfaction for the street. We work to balance both serviceability and consumer satisfaction when programming street repair and replacement work. However, in some cases, due to the City practices regarding asphalt on concrete pavement, the pavement is scheduled for replacement prematurely, prior to reaching the end of its service life. This has a negative impact on the City's overall pavement network as limited funds are spent to address aesthetic concerns on a street that has not reached the end of its service life.

5. Future Budget Scenario and Condition Implications

The condition prediction curve was utilized in combination with the anticipated replacement cost per square yard for removal and replacement of concrete pavement including anticipated annual inflation (3%), and composite pavement rating and age of the City's concrete pavement system to develop a pavement budget and system condition prediction spreadsheet (Appendix D). The spreadsheet is a simplified representation of how the City's overall pavement system is expected to age and deteriorate under a specific funding scenario. It allows for a repeatable annual analysis to evaluate anticipated impacts of the City's predicted spending on the future overall pavement system condition. For 2026, the cost for pavement removal and replacement was set at \$79.34 per square yard, based on the most recent bid data. This reflects an approximate 9% increase from the 2025 cost of \$71.85 per square yard. Table 1 provides a year-by-year comparison of average pavement replacement costs from 2017 through 2026.

Table 1. Historic Cost per Square Yard Comparison.

2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
\$57.88	\$58.49	\$62.76	\$61.29	\$58.51	\$63.46	\$110.50	\$80.90	\$71.85	\$79.34
-2.32%	1.04%	6.80%	-2.40%	-4.75%	7.80%	42.57%	-36.59%	-12.60%	9.44%

While any number of scenarios could be run, Figure 9 assumes a constant \$4.0 million capital street reconstruction budget for the next five years. If the budget were to remain at a constant \$4.0 million, the overall pavement condition is projected to decline slightly from 8.00 in 2027 to 7.84 in 2031. It is important to note that if the budget amount is held constant for long periods, we can always expect future decreases in the pavement ratings simply due to inflation. Escalating construction costs year over year would slowly decrease the amount of pavement area that could be replaced. Additionally, the analysis reflected in the figure below only considers our existing slab network. Additional pavement added to the City's system, such as through acceptance of new streets as part of subdivision development or through annexation, will also impact future funding needs and pavement ratings.

Budget versus Predicated Rating
\$4 million Annual Budget

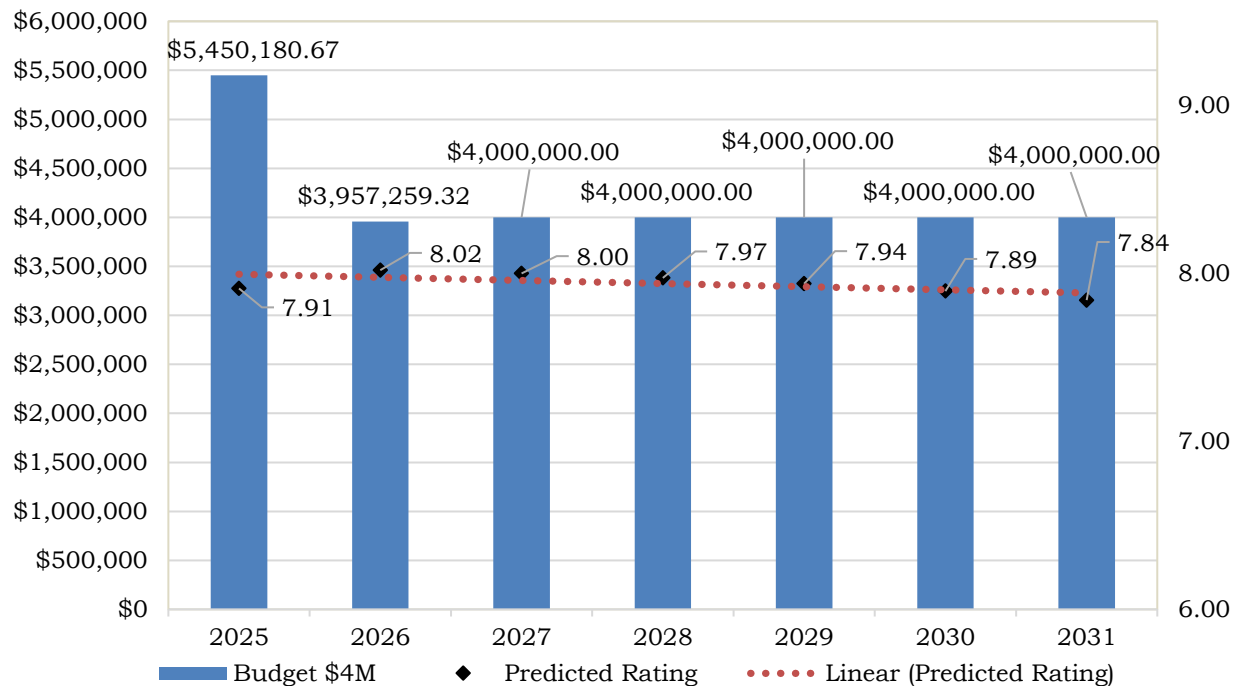


Figure 9

6. Summary and Recommended 5-Year Plan

While the City’s pavement condition rating shows a slight downward trendline from 2013-2022 (see Figure 7 on Page 10), we see a slight upward trend from 2022-2026. The City’s 2025 overall concrete pavement condition rating of 7.91 is considered “good” to “very good” condition.

Figure 10 depicts the proposed concrete slab replacement budgetary requests in the Public Works Capital Replacement Plan, and the predicted concrete pavement condition ratings. At the funding levels shown in the chart, our pavement rating is forecasted to remain relatively stable, with a slight decrease from a 2025 rating of 7.91 to a predicted rating of 7.84 in 2031. The budgetary requests average approximately \$4 million annually, producing a pavement condition trend that is consistent with the constant \$4 million funding analysis scenario (Figure 9). While the overall pavement condition remains relatively stable, please note that the trendline is slightly negative, and that any funding reductions would have a detrimental impact to our pavement system and funding increases would have a positive impact to our pavement system.

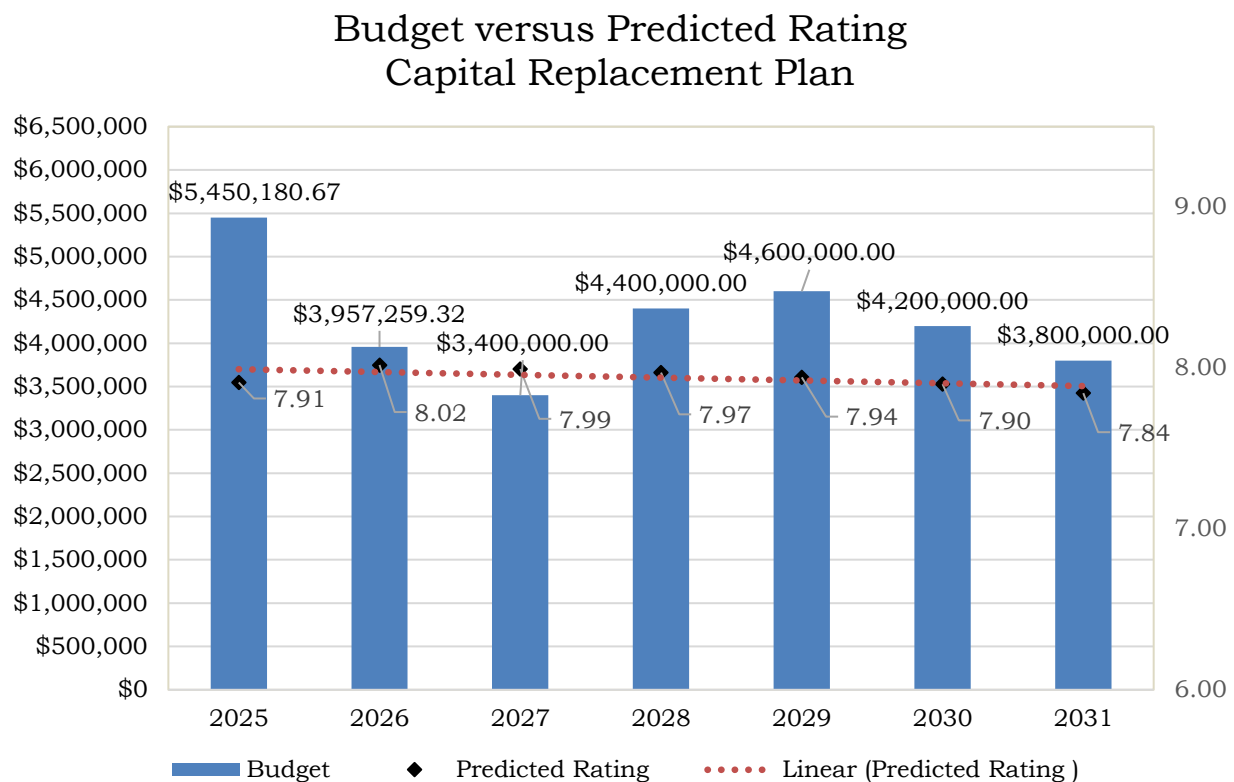


Figure 10*

*Budget values do not include grant funded projects.

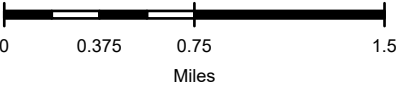
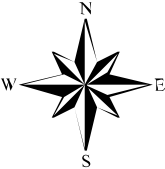
The Department of Public Works will continue to balance available funding and anticipated work to meet the City's expectations and deliver a reliable pavement system. As pavement management professionals it is our responsibility to share unbiased information and help develop common performance expectations. To that end, the information in this Report and pavement data will be re-evaluated and updated annually to continue to track historic spending and pavement condition, predict future condition, and help Staff refine future budgetary requests.

APPENDICES

Appendix A

Concrete Pavement Inventory Data						Slab Replacement/Capital Project		
Year	Rating	# of Slabs Rated	Inspection Area	Size of City System (SY)	Additions (SY)	Spending	Pavement Replaced (SY)	Cost/SY
2015	8.13	136,048	City Wide	2,738,671	12669	\$2,345,059	56,064	\$59.80
2016	8.17	140,443	City Wide	2,751,340	28621	\$2,569,384	62,524	\$59.22
2017	8.20	59,068	A, B, C	2,779,961	5413	\$1,881,634	32,507	\$57.88
2018	8.21	56,795	D, E, F	2,785,374	0	\$1,739,731	29,742	\$58.49
2019	8.23	54,883	G, H, I	2,785,374	8,679	\$2,339,305	37,274	\$62.76
2020	8.11	57,563	A, B, C	2,794,053	0	\$2,100,179	34,266	\$61.29
2021	8.00	47,511	D, E, F	2,794,053	7621	\$2,048,216	35,006	\$58.51
2022	7.81	56,098	G, H, I	2,801,674	3,134	\$2,174,600	34,268	\$63.46
2023	7.89	51,564	A, B, C	2,804,808	64133	\$3,671,146	33,227	\$110.50
2024	7.91	47,872	D, E, F	2,876,621	2546	\$3,901,530	50,634	\$80.90
2025	7.91	64,228	G, H, I	2,874,013	33898	\$5,450,181	76,408	\$71.85
2026	TBD	TBD	A, B, C	2,907,500	TBD	TBD	TBD	\$79.34

Street Classification Map



- Major Arterial
- Minor Arterial
- Collector
- Local
- Future Major Arterial
- Future Minor Arterial
- Future Collector



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Published: May 2022

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Document Path: R:\Update Maps\ArcGISProPublic\DR\Maps\StandardPublic\DR\Maps.aprx Layout: Street Classification Map

Pavement Surface Evaluation and Rating

PASER Concrete Roads Manual

RATING
10



RATING
7



RATING
4



RATING
1



Pavement Surface Evaluation and Rating

PASER Concrete Roads Manual

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Lynn Entine, Entine & Associates, *editor*
Susan Kummer, Artifax, *designer*

Pavement Surface Evaluation and Rating

Concrete PASER Manual

Many local agencies are responsible for maintaining roadways with concrete pavements. This manual offers useful information for planning maintenance and managing Portland Cement Concrete pavements. It discusses common problems and typical repairs and includes a visual system for evaluating and rating concrete pavements.

The Wisconsin Transportation Information Center has developed PASER manuals for other pavement types (see page 29). The rating systems are similar and compatible so that local road agencies can work with a comprehensive condition rating method. The rating procedure can be used as condition data for the Wisconsin DOT local road inventory (WISLR) and as part of a computerized pavement management system like PASERWARE.

Taking an organized approach to roadway management has many benefits. By documenting the actual conditions of roads you can set realistic budgets, make timely repairs, and set up cost effective maintenance procedures. Developing an overall plan for the roadway system lets local agencies develop budgets and plan for future needs. When detailed information is available, local officials can respond more effectively to questions from the public. A planned approach is easier to explain and receives greater public support.

Several key steps are necessary to develop a meaningful roadway management plan. First, you must inventory the existing condition. This is normally done by dividing the roadway into segments with similar conditions. During the inventory you collect information on construction history, roadway width, etc. Then you need some method for assessing the condition of the existing roadway. This *Concrete PASER Manual* uses a visual approach. Other information from material sampling, testing, and traffic counts can be useful when planning specific projects.

Another necessary step is setting priorities for roadway improvements. You can use roadway condition and the local importance of these roads to assign priorities. Then budgets can be developed based on cost estimates for the projected improvements. Since not all improvements can be made in one year, you can set up a 3-5 year budget and capital improvement plan. Normally this is updated annually.

Rigid pavement performance

Most concrete pavements on local roads are either plain (non-reinforced) or reinforced concrete. Reinforcement is usually provided by steel wire mesh placed approximately at mid slab depth. The reinforcement is intended to limit crack opening and movement in the concrete slab.

Since concrete slabs need to move (expand and contract) while curing and as temperature changes, pavements are constructed with contraction joints to control cracking. These are usually sawn into the pavement shortly after initial curing. This joint gives the slab a place to crack and makes a straight, well-formed groove to seal.

Expansion joints are occasionally provided. These are wider, full depth, and filled with a material to allow expansion. If used, they are placed adjacent to structures that cannot move with the pavement such as bridges, manholes, and other utility structures.

So-called rigid pavements (concrete) carry traffic loadings differently than flexible pavements (asphalt). Concrete pavements are designed to act like a beam and use the bending strength of the slabs to carry the load. Therefore load transfer across cracks and joints is important, especially on roads with heavy truck and bus traffic. Hairline and narrow cracks still have interlocked concrete aggregate and can effectively transfer loads. Because wide cracks and widely-spaced joints open up, they cannot transfer loads and must take higher edge loads. These higher edge loads can cause further cracking and deterioration along the joint or crack edges.

Some concrete pavements use joints that have load transfer dowels. These are smooth steel bars placed across the joint. They transfer traffic loads between adjacent concrete slabs while allowing opening and closing of the joint. These bars can rust and sometimes cause problems. The corrosion causes forces on the concrete which lead to spalling, cracking and general joint deterioration. Epoxy coated dowels are now commonly used.

Unsupported slab edges will deflect or bend under a load. If the supporting soil is saturated it can squirt up through joints or cracks when the slab bends. This is called *pumping*. Eventually the loss of supporting soil through pumping creates an empty space or void under the slab. The slabs may then crack further under loads and joints deteriorate more.

Undoweled joints under heavy truck traffic may *fault*. This is when one slab edge is lower than the next slab. The downstream traffic slab will be lower than the upstream slab, creating a step. Faulting creates a poor ride.

You can often detect pumping by the soil stains around pavement joints or cracks. The resulting voids can be filled with grout. Slabs can be leveled by slab jacking or mud jacking. Obviously, sealing cracks and joints and improving drainage of the subsoils will help reduce pumping, faulting, and joint failures.

Pavement conditions and defects

It is helpful to separate various conditions common to concrete pavements. These are described individually in some detail. We also include causes for deterioration and common strategies for repair. Some defects are localized while others indicate that problems may develop throughout the pavement. It is important to distinguish between local and widespread defects. Assessing the conditions of actual roadways also involves looking for combinations of these individual defects.

Surface defects

Wear and polishing, map cracking, pop-outs, scaling, shallow reinforcing, spalling.

Joints

Longitudinal joint, transverse joints.

Pavement cracks

Transverse slab cracks, D-cracking, corner cracks, meander cracks.

Pavement deformation

Blow ups; faulting; pavement settlement or heave; utility repairs, patches and potholes; manhole and inlet cracking; curb or shoulder deformation.

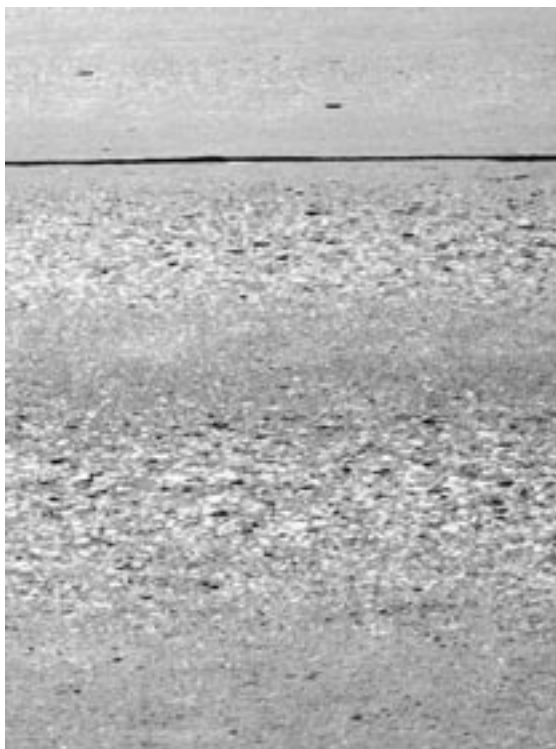
In reviewing the different defects it is important to consider both their severity and extent. Generally, conditions begin slowly and progressively become more serious. Slight defects may grow into moderate and then severe conditions. In addition, the defects might initially be indicated only in a few isolated cases. Examples in the rating section will help you identify how bad a condition is and how extensive it is.

SURFACE DEFECTS

Wear and polishing

A worn or polished surface may appear from traffic wearing off the surface mortar and skid resistant texture. Extensive wear may cause slight ruts where water can collect and cause hydroplaning. Sometimes traffic may polish aggregates smooth, causing the surface to be slippery. An asphalt overlay or grinding of the concrete surface can restore skid resistance and remove ruts.

► **Surface mortar worn away exposing larger aggregate. Accidents or friction testing may indicate a slippery surface in need of improved texture.**

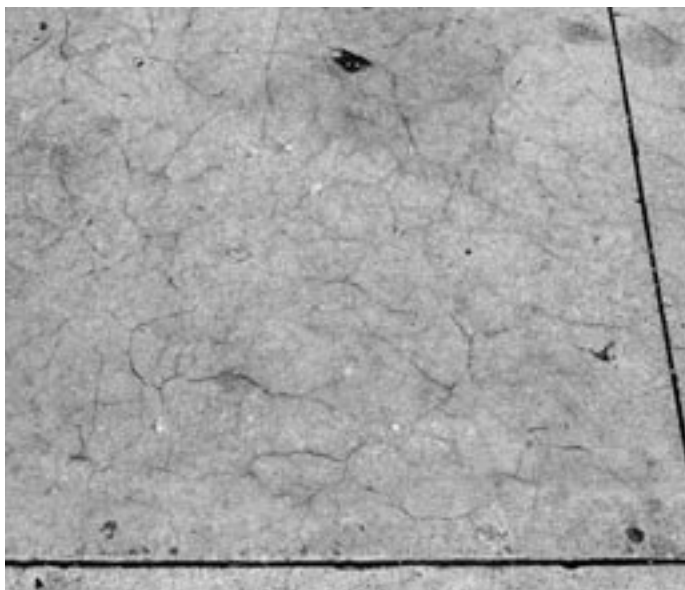


Map cracking

A pattern of fine cracks usually spaced within several inches is called map cracking. It usually develops into square or other geometrical patterns. Can be caused by improper cure or overworking the surface during finishing. If severe, cracks may spall or surface may scale. Repair is usually limited to very severe conditions. An asphalt overlay or partial depth patching may then be necessary.

Pop-outs

Individual pieces of large aggregate may pop out of the surface. This is often caused by chert or other absorbent aggregates that deteriorate under freeze-thaw conditions. Surface patching can be done temporarily with asphalt. For severe areas, a more permanent partial depth concrete patch may be necessary.



▲ **Close-up of a polished pavement surface.**

◀ **Hairline surface cracks, probably shallow in depth. May not cause any long term performance problems.**



◀ **Extensive pop-outs of large aggregate from surface. Pop-outs alone have not affected pavement serviceability.**

►
Moderate
surface scaling.
Loss of mortar
and fines from
the surface
beginning to
expose larger
aggregate.



►
Severe scaling.
Some larger
aggregate is
loose.



Reinforcing
bar exposed.
Shallow
concrete cover
caused large
spall to develop
around it.
▼



Scaling

Scaling is surface deterioration that causes loss of fine aggregate and mortar. More extensive scaling can result in loss of large aggregate. Often caused by using concrete which has not been air-entrained, the surface becomes susceptible to freeze-thaw damage. Scaling is also aggravated by the use of deicing chemicals.

Scaling can occur as a general condition over a large area or be isolated to locations where poor quality concrete or improper finishing techniques caused loss of air entrainment. In severe cases, deterioration can extend deep into the concrete. Traffic action may accelerate scaling in the wheel paths.

Grinding may remove poor quality surface concrete. Asphalt overlays or a bonded concrete resurfacing can prolong the life of the pavement. Partial depth patching of isolated areas may also be used.

Shallow reinforcing

If the steel reinforcing bar or mesh is placed too close to the concrete surface it will lead to concrete spalling. Corrosion of the steel creates forces that

break and dislodge the concrete. Often you can see rust stains in the surface cracks before spalling occurs. Can be temporarily patched with asphalt. Permanent repairs are difficult and usually involve replacing the steel and making a partial depth or full depth concrete repair.

◀
**Surface stain
parallel to
joint. Indicates
reinforcing
steel too close
to surface.**



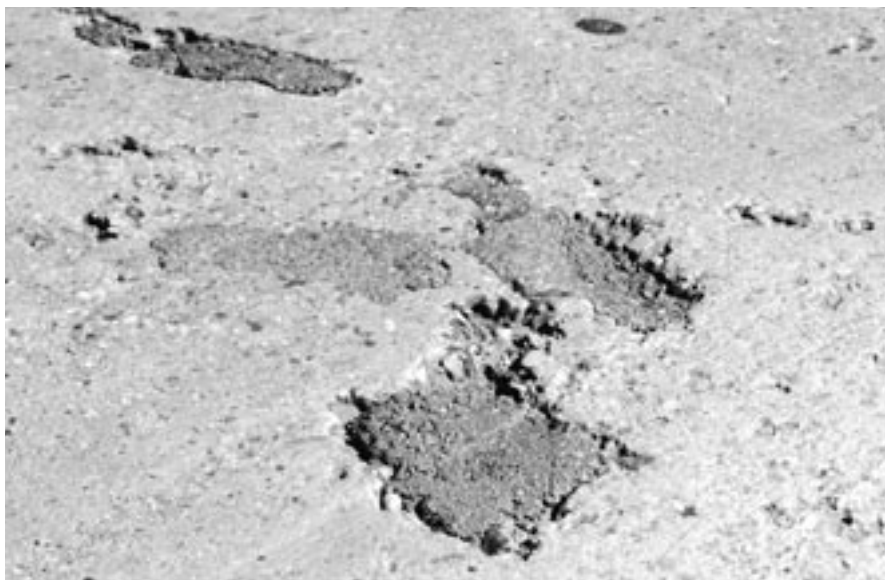
◀ **Wire reinforcing mesh placed close to surface. Corrosion of the reinforcing steel causes the surface mortar to spall. Very difficult to patch and repair.**

Spalling

Spalling is the loss of a piece of the concrete pavement from the surface or along the edges of cracks and joints. Cracking or freeze-thaw action may break the concrete loose, or spalling may be caused by poor quality materials. Spalling may be limited to small pieces in isolated areas or be quite deep and extensive.

Repair will depend on the cause. Small spalled areas are often patched. Spalling at joints may require full depth joint repair.

►
Small surface
spalls that
have been
patched.



►
Spalling along
longitudinal
joints.



▼ A severely
spalled crack.



►
Spalling over
shallow reinforcing.



JOINTS

Longitudinal joints

Longitudinal paving joints are constructed to be narrow in width and usually well sealed. As pavements age and materials deteriorate, joints may open and further deteriorate. Cracks parallel to the initial joint may develop and accelerate into spalling or raveling of the longitudinal joint. Settlement, instability, or pumping of the subgrade soil can cause longitudinal joints to fault. One common cause of cracks parallel to the longitudinal joints is waiting too long after the pour to saw the joint. Then, during initial cure the slab will crack roughly parallel (but not exactly) to the sawn joint.

Maintaining a tight joint seal can prevent intrusion of water and reduce freeze-thaw damage and pumping. Severe joint deterioration may require full depth patching and replacement of the joint.

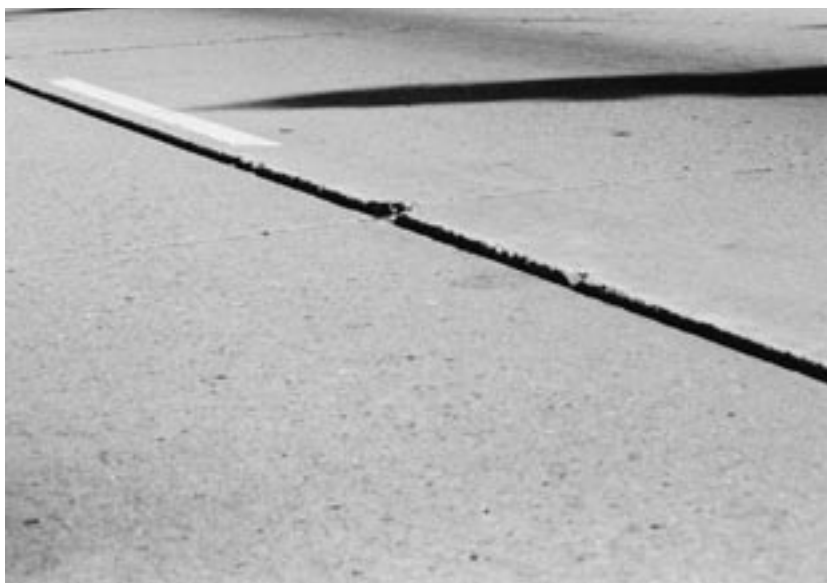


▲ Joint open about 1/2".

◀ New, well-sealed longitudinal joint.



▲ Additional joint cracking, spalling, and broken pavement. Full depth repair is needed.



▲ Faulted longitudinal joint (over 1/2") with slight edge spalling.

Transverse joints

Transverse joints are constructed in concrete pavements to permit movement of the concrete slabs. Some joints are constructed with load transfer dowels. If the pavement has poor subsurface drainage, traffic may eventually create voids under the joints due to pumping and cause the slabs to settle or fault. Freeze-thaw deterioration at the joint can cause spalling and create additional cracks parallel to the joint. Load transfer bars may corrode, creating expansive forces that further deteriorate the concrete at the joint.

Occasionally, severe joint deterioration may develop from poor quality aggregate and so-called D-cracking. Joint sealing will help, but complete replacement is usually necessary.

Overall, lack of joint maintenance and rehabilitation is a common problem. Maintaining a tight, well sealed joint can reduce water intrusion and thereby reduce freeze-thaw damage, pumping, blow-ups, D-cracking, and spalling. Early repair of minor defects can often reduce the need for complete joint repair or replacement.

▼ New, well-sealed transverse joint.



▼ Transverse joint has slight faulting and spalling.



► Severe spalling of a transverse joint.



► ► Cracks parallel to joint. Dark color next to transverse joint likely indicates D-cracking and additional deterioration. Full depth repair required.



► Severe spalling has required temporary patching. Complete joint replacement is necessary.



PAVEMENT CRACKS*Transverse slab cracks*

Transverse cracks may appear parallel to joints and can be caused by thermal stresses, poor subgrade support, or heavy loadings. They are sometimes related to slabs having joints spaced too widely. Joints spaced more than 15' apart commonly develop mid-slab transverse cracks.



**Transverse,
open crack.**



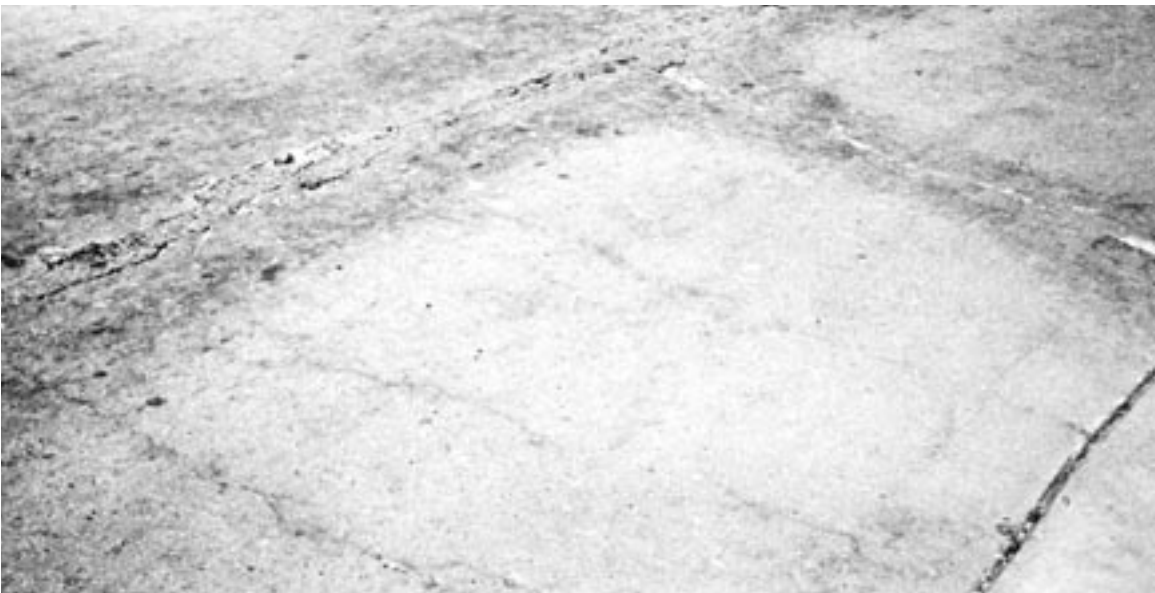
**Faulted transverse
crack with slight
edge spalling.**



As with joints, these cracks may deteriorate further if not sealed well. Slabs can fault at cracks which can spall and develop additional parallel cracking. Severe deterioration may require patching individual cracks. Multiple transverse cracks in individual slabs indicate further deterioration. Extensive transverse cracking indicates pavement failure and the need for complete replacement.



**Closely spaced,
hairline trans-
verse cracks.
Indicates slab
is broken
and in need of
replacement.**



D-cracks

Occasionally, severe deterioration may develop from poor quality aggregate. So called D-cracking develops when the aggregate is able to absorb moisture. This causes the aggregate to break apart under freeze-thaw action which leads to deterioration. Usually, it starts at the bottom of the slab and moves upward.

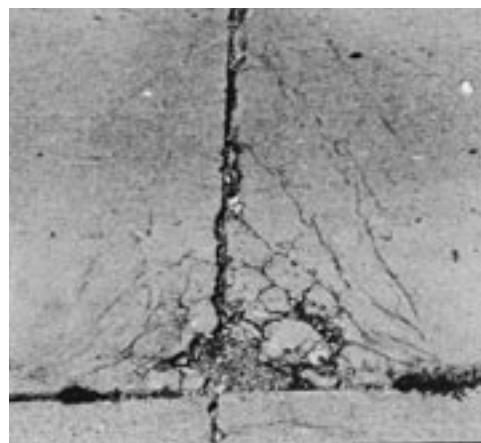
Fine cracking and a dark discoloration adjacent to the joint often indicate a D-cracking problem. Once this is visible on the surface the pavement material is usually severely deteriorated and complete replacement is required.

Joint or crack sealing helps slow D-cracking deterioration. This is a serious defect because it may indicate a material quality problem throughout the pavement.

Surface discoloration near joints and cracks indicates D-cracking and severe slab deterioration.



►
Multiple crack patterns adjacent to joints. Common D-cracking pattern.



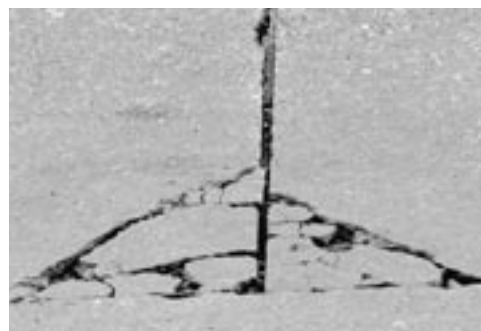
Corner cracks

Diagonal cracks near the corner of a concrete slab may develop, forming a triangle with a longitudinal and transverse joint. Usually these cracks are within one foot of the corner of the slab. They are caused by insufficient soil support or concentrated stress due to temperature related slab movement. The corner breaks under traffic loading. They may begin as hairline cracks.

Some corner cracks extend the full depth of the slab while others start at the surface and angle down toward the joint. With further deterioration, more cracking develops; eventually the entire broken area may come loose. This may be a localized failure or may point to widespread maintenance problems.

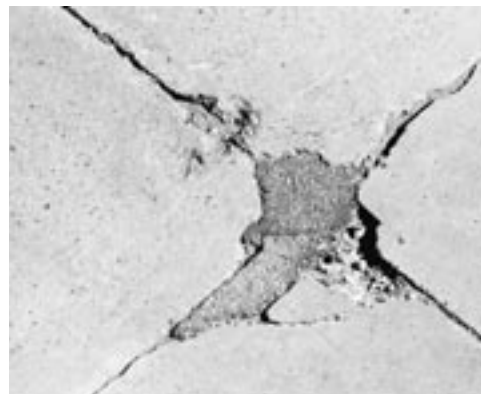
Partial or full depth concrete patching or full depth joint replacement may be necessary when corner cracking is extensive.

►
Corner cracking with broken concrete pieces.



▲ First signs of corner cracking.

►
Severely spalled corner crack with missing pieces and patching.



Meander cracks

Some pavement cracks appear to wander randomly. They may cross a slab diagonally or meander like a serpent. Meander cracks may be caused by settlement due to unstable subsoil or drainage problems, or by utility trench settlement. Frost heave and spring thaw can also cause them. They are often local in nature and may not indicate general pavement problems.

Minor cracks may benefit from sealing to minimize water intrusion. Extensive or severe meander cracking may require replacing the slab, stabilizing the subsurface, or improving drainage.



Meander crack roughly parallel to longitudinal joint.



Meander crack caused by settlement. Lack of maintenance allows water to intrude and debris to collect in crack.



Faulting and spalling of a meander crack.

PAVEMENT DEFORMATION

Blowups

Concrete slabs may push up or be crushed at a transverse joint. This is caused by expansion of the concrete where incompressible materials (sand, etc.) have infiltrated into poorly sealed joints. As a result, there is no space to accommodate expansion. It is more common in older pavements with long joint spacing. Pressure relief joints can be installed and blowup areas must be patched or reconstructed.



◀ Internal pressure has partially raised slab at the joint. Complete replacement is required.

A pavement blowup in progress. Concrete is crushed and slabs buckled.



Faulting

Joints and cracks may fault or develop a step between adjacent slabs. Faulting is caused by pumping of subgrade soils and creation of voids. Heavy truck or bus traffic can rapidly accelerate faulting. Longitudinal joints may fault due to settlement of an adjacent slab.

Faulting creates a poor ride and may cause slab deterioration. Minor faulting can be corrected by surface grinding. Voids can be subsealed, or slabs mud jacked back to level position. Severe cases may need joint replacement.



▲ Minor faulting of transverse joints. Aggravated by heavy traffic. Surface grinding will improve ride.



▲ Faulted longitudinal joint.

► Severely faulted joint. Slab jacking is necessary.



►
Settlement
caused
meander crack
with faulting.

Extensive
cracking and
patching
caused by
settlement.
Pavement
was built on
unstable sub-
grade soils.



Pavement settling or heave

Unstable or poorly drained subgrade soils may cause pavements to settle after construction. Poorly compacted utility trenches may also settle. This may be a gentle swale or a fairly severe dip.

Frost-susceptible soils and high water tables can cause pavements to heave during the winter months. Extensive pavement cracking and loss of strength during the spring can result in severe deterioration. Improved drainage and stabilization of subgrade soils are usually necessary, along with pavement reconstruction.

Utility repairs, patches and potholes

Replacement or repair of utilities will require cuts or utility openings. When repaired these pavement patches may show settlement, joint deterioration, or distress under continued traffic loading. Patches from previous repairs may perform like original pavement or experience joint deterioration or settlement.

Localized failures of materials or subgrade soil can cause individual potholes. Surface spalling or other material defects may develop into localized potholes. Full depth patching is usually required.



▲ Utility repair or full depth joint repair. Very good condition.



▲ Asphalt patches. Poor (top) and fair (bottom) condition.



▲ Potholes caused by severe joint deterioration. Need repair.

Manhole and inlet cracks

Normal pavement movement due to frost heaving and movements due to changes in temperature often cannot be accommodated in the pavement adjacent to a manhole or a storm sewer inlet. Cracks and faulting may develop and the concrete slab may deteriorate further. These are often localized defects that may not indicate a general pavement problem. Sealing and patching may slow the deterioration. Eventually full depth repairs may be required.

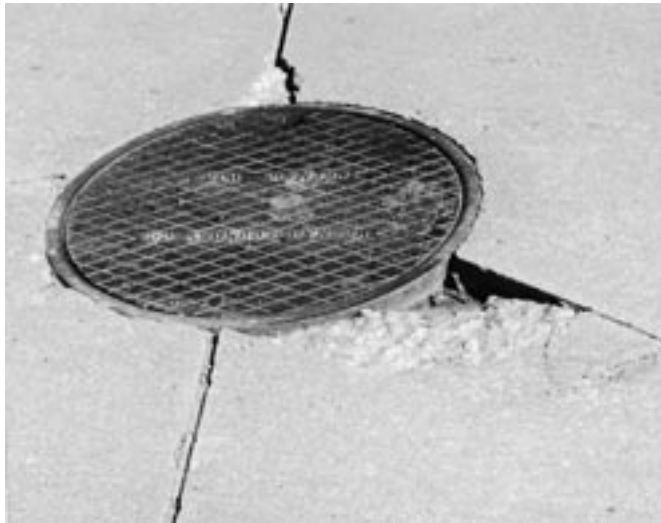
Curb or shoulder deformation

Concrete curb and gutter, or paved concrete shoulders, may separate from or settle along the main pavement. The longitudinal joints between the pavement and curb or shoulder may open, fault, or deteriorate like other longitudinal joints. When severe enough to disrupt drainage, the curb and gutter need to be replaced. Shoulder deterioration may require patching or replacement.

Settled gutter and joint filled with debris. Joint maintenance is needed. ▼



Extensive curb deterioration. Freeze-thaw damage to curb adjacent to inlet, and gutter is displaced. New curb and gutter are needed. ►



Two spalls at manhole in a new pavement. Partial depth patching would be beneficial. ◀

Extensive cracking and spalling at manhole requiring full depth repairs. ▼



Rating pavement surface condition

With an understanding of roadway conditions and distress, you can evaluate and rate concrete pavements. The rating scale ranges from **10—excellent** condition to **1—failed**. In general, most pavements will deteriorate through the phases listed in the rating scale. However, it is common for pavements to skip several levels when major defects appear or when the pavement is repaired. The time it takes to go from an excellent (10) to a very poor condition (1) depends largely on the quality of the original construction and the amount of heavy traffic loading.

Once significant deterioration begins it is common to see pavements deteriorate rapidly. This is usually due to the combined effects of loading and additional moisture. As a pavement ages and additional cracking develops, more moisture can enter the pavement and accelerate the rate of deterioration.

Look at the photographs which follow and become familiar with the descriptions of the individual rating categories. To evaluate an individual pavement segment, first determine its general condition. Is it relatively new, toward the top end of the scale? In very poor condition and at the bottom of the scale? Or somewhere in between?

Next, think generally about the appropriate maintenance method.

Finally, review the individual pavement condition and distress and select the appropriate pavement rating. Remember that individual pavements will not have all of the types of distress listed for any particular rating. They may have only one or two types. Use the categories in the table below and on page 16.

We have found that relating a normal maintenance or rehabilitation procedure to the surface rating scheme helps you

use the rating system. However, choosing an individual surface rating should not automatically dictate the final maintenance or rehabilitation technique.

You should consider safety, future traffic projections, original construction, and pavement strength since these may dictate a more comprehensive rehabilitation. On the other hand, it may be appropriate under special conditions to do nothing and let the pavement fully deteriorate and then rebuild when funds are available.

RATINGS ARE RELATED TO NEEDED MAINTENANCE OR REPAIR

Rating 9 & 10	New pavement or recent concrete rehabilitation. No maintenance required.
Rating 7 & 8	First signs of wear, scaling, or cracking. Needs routine maintenance.
Rating 5 & 6	First signs of corner cracks, faulting, and joint or crack spalling. Requires surface repairs, sealing or partial depth patching.
Rating 3 & 4	Moderate to severe faulting, multiple slab cracking, and joint failure. Requires extensive slab or joint rehabilitation.
Rating 1 & 2	Pavement failure requiring complete reconstruction.

Rating system

Surface rating	Visible distress*	General condition/ treatment measures
10 Excellent	None.	New pavement. No maintenance required.
9 Excellent	Traffic wear in wheelpath. Slight map cracking or pop-outs.	Recent concrete overlay or joint rehabilitation. Like new condition. No maintenance required.
8 Very Good	Pop-outs, map cracking, or minor surface defects. Slight surface scaling. Partial loss of joint sealant. Isolated meander cracks, tight or well sealed. Isolated cracks at manholes, tight or well sealed.	More surface wear or slight defects. Little or no maintenance required.
7 Good	More extensive surface scaling. Some open joints. Isolated transverse or longitudinal cracks, tight or well sealed. Some manhole displacement and cracking. First utility patch, in good condition. First noticeable settlement or heave area.	First sign of transverse cracks (all tight); first utility patch. More extensive surface scaling. Seal open joints and other routine maintenance.
6 Good	Moderate scaling in several locations. A few isolated surface spalls. Shallow reinforcement causing cracks. Several corner cracks, tight or well sealed. Open (1/4" wide) longitudinal or transverse joints and more frequent transverse cracks (some open 1/4").	First signs of shallow reinforcement or corner cracking. Needs general joint and crack sealing. Scaled areas could be overlaid.
5 Fair	Moderate to severe polishing or scaling over 25% of the surface. High reinforcing steel causing surface spalling. Some joints and cracks have begun spalling. First signs of joint or crack faulting (1/4"). Multiple corner cracks with broken pieces. Moderate settlement or frost heave areas. Patching showing distress.	First signs of joint or crack spalling or faulting. Grind to repair surface defects. Some partial depth patching or joint repairs needed.
4 Fair	Severe polishing, scaling, map cracking, or spalling over 50% of the area. Joints and cracks show moderate to severe spalling. Pumping and faulting of joints (1/2") with fair ride. Several slabs have multiple transverse or meander cracks with moderate spalling. Spalled area broken into several pieces. Corner cracks with missing pieces or patches. Pavement blowups.	Needs some full depth repairs, grinding, and/or asphalt overlay to correct surface defects.
3 Poor	Most joints and cracks are open, with multiple parallel cracks, severe spalling, or faulting. D-cracking is evident. Severe faulting (1") giving poor ride. Extensive patching in fair to poor condition. Many transverse and meander cracks, open and severely spalled.	Needs extensive full depth patching plus some full slab replacement.
2 Very Poor	Extensive slab cracking, severely spalled and patched. Joints failed. Patching in very poor condition. Severe and extensive settlements or frost heaves.	Recycle and/or rebuild pavement.
1 Failed	Restricted speed. Extensive potholes. Almost total loss of pavement integrity.	Total reconstruction.

* Individual pavements will not have all of the types of distress listed for any particular rating. They may have only one or two types.



RATING 10 & 9

EXCELLENT —

No maintenance required

Rating 10 is for new pavement. Rating 9 is used for recent concrete rehabilitation or like-new condition. Some traffic wear. Slight map cracking or pop-outs. No maintenance required.



RATING 10
New pavement
with integral
curb.



COC Notes 10 - No cracks, asphalt patches or partial depth patches. No displacement, scaling or popouts. May have minor imperfections in the original pouring of the slab (e.g. rough edges from surface scrapes, rounded corners that show no sign of continuing wear).



RATING 9
Like new
condition.



COC Notes 9 - The slab may have one minor hairline crack and no asphalt or partial depth patch. Minor imperfections are allowed such as minor scaling or few popouts. No raveling of the joints.



RATING 9
Recent joint
rehabilitation.
Like new
condition.

RATING 8

VERY GOOD — Little or no maintenance required

More surface wear, or slight defects showing in lanes. Pop-outs, slight surface scaling, partial loss of joint sealant, or isolated meander crack. Isolated manhole distress. Little or no maintenance required.

COC Notes 8 - The slab may have one minor crack separating it into two pieces, but no displacement. May have partial depth patch in excellent condition, but no asphalt patches. Some minor scaling allowed or few

►
Slight
scaling.



►
Isolated
spall at
manhole.



▲
Partial
loss of
joint
sealant.

►
Isolated
meander
crack, tight
and well
sealed.





RATING 7

GOOD — May require some routine sealing or maintenance

First signs of transverse cracking, patching or repair; more extensive pop-outs or scaling; some manhole displacement, isolated heave or settlement. May need some sealing or routine maintenance.

◀ **Residential street pavement in good condition after many years of service. May only need periodic joint sealing maintenance.**



◀ **Extensive pop-outs. Pavement is unsightly but still provides good level of service.**



◀ **Recent full depth pavement repair. In very good condition.**



◀ **Well sealed transverse crack. Joint repairs in good condition.**

◀ **Transverse crack. Tight, sound pavement.**

COC Notes 7 - Slab may have one crack separating it into two pieces. Joints may have asphalt patching, but not more than 2" wide. May have partial depth patches in good condition. No patches inside the slab.

RATING 6

GOOD — Joint and crack sealing needed

First signs of corner cracking or shallow reinforcement. More frequent transverse cracks. Open ($\frac{1}{4}$ ") joints and cracks. Moderate scaling. Needs joint and crack sealing.

COC Notes 6 - Slab is broken into 3 sections. Asphalt patches at the joints not more than 2" wide. May have partial depth patching in good condition.

► Several transverse cracks. Tight or well sealed.

Surface rust stain. Indicates shallow reinforcing.

► Moderate scaling.



▲ First signs of corner cracks.



▲ Isolated, tight meander crack. Several pop-outs. Remaining joints and cracks all tight and sound.





RATING 5

FAIR — Partial depth patching and joint repairs may be needed

First signs of joint or crack spalling, or faulting. Multiple cracking at corners with broken pieces. Patching in fair condition. Surface texturing repairs may be necessary. Some partial depth patching and joint repairs may be needed.



Faulting at longitudinal joint and spalling along joint edge.



COC Notes 5 - Slab is cracked into more than 3 sections. Asphalt patches at the joints are more than 3" wide. Partial depth patches are failing.



First signs of transverse joint faulting. Grinding will improve ride.



▲ **Open cracks with edge spalling. Corner crack and broken corner piece.**



▲ **Isolated manhole problems and joint spalling. Full depth repair required adjacent to manhole.**

RATING 5

FAIR — (continued)
Partial depth patching
and joint repairs may
be needed

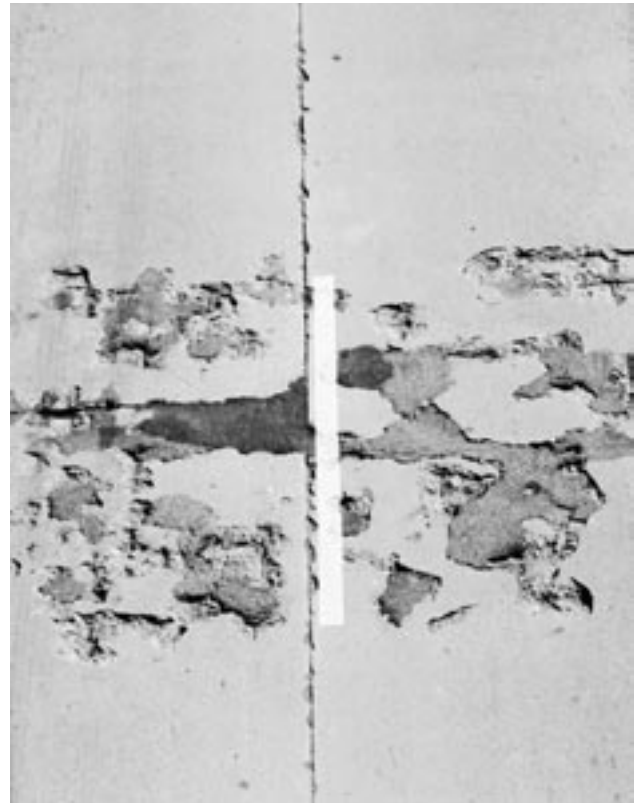
► Broken corner
pieces. Some
joint spalling.



Patching in
▼ fair condition.



▲ Severe scaling over extensive areas.
Patching or overlay needed.



▲ Spalling caused by shallow reinforcing steel.
Temporary patching needs to be followed
by extensive partial depth repairs.

Wide open meander crack (1") with edge spalling.

▼ Corner crack with spalling.



RATING 4

FAIR — Some full depth joint or crack repair required

Severe surface distress requires asphalt overlay or extensive surface texturing. Multiple transverse cracks with spalling and broken pieces. Corner cracking with potholes or patches. Blowups. Some full depth joint or crack repair required.



All joints show some deterioration and spalling.



COC Notes 4 - Slab has patches that cover 30% of its surface. Joints are unraveled 3" or more.



Multiple open transverse cracks. Failed corner crack. Patches in fair condition.



Moderate spalling at transverse joint.

▲ Corner cracking developed into small hole; moderate spalling of transverse crack.



Moderate to severe longitudinal joint faulting. Transverse joint also has spalling.

RATING 3

POOR — Extensive full depth patching plus some full slab replacement required

Most joints and cracks are open (1"), spalled, or patched. D-cracking is evident. Severe (1") faulting. Extensive full depth patching required plus some full slab replacement.

► Joints and cracks badly spalled. Patching is failing. Full depth repairs required.



Multiple transverse cracks. Poor longitudinal joint with spalling.
▼



COC Notes 3 - Slab has asphalt or partial depth patches that cover 30-50% of its surface. Joints unraveling more than 3" wide. Cracked and displaced slab in need or repair.

► D-cracking (discoloration) at transverse joint and corner cracking. Needs full-depth repair.



► Discoloration at joints indicates D-cracking. Slab replacement needed.



► Badly spalled joint and open crack. Slab or joint replacement needed.



▲ Failed joint needs replacement.

COC Notes 2 - Slab has asphalt or partial depth patches that cover over 50% of its surface. Slab is undermined or displaced. Severe deterioration of the joints and surface. The slab may create unsafe driving conditions.

RATING 2

VERY POOR — Pavement recycling and reconstruction necessary



◀
Failed patches.
Replace entire
portion of lane.



▲ Remove and replace
pavement around
manhole and inlet.

◀
Closely spaced
transverse cracks and
poor longitudinal
joint. Replace slab.



▲ Extensive joint
failure. Major
rehabilitation or
complete replace-
ment needed.

◀
Severe
deterioration.
Requires
extensive
reconstruction.



RATING 1

FAILED — Complete reconstruction necessary

►
Slab and patch failure.



►
Broken slabs require complete rebuilding.



►
Total failure.



Practical advice on rating roads

Inventory and field inspection

Most agencies routinely observe roadway conditions as a part of their normal work and travel. However, an actual inspection means looking at the entire roadway system as a whole and preparing a written summary of conditions. This inspection has many benefits over casual observations. It can be helpful to compare segments, and ratings decisions are likely to be more consistent because the roadway system is considered as a whole within a relatively short time.

An inspection also encourages a review of specific conditions important in roadway maintenance, such as drainage, adequate strength, and safety.

A simple written inventory is useful in making decisions where other people are involved. You do not have to trust your memory, and you can usually answer questions in more detail. Having a written record also improves your credibility with the public.

Finally, a written inventory is very useful in documenting changing roadway conditions. Without records over several years, it is impossible to know if your overall road conditions are improving, holding their own, or declining.

Annual budgets and long range planning are best done when based on actual needs as documented with a written inventory.

The Wisconsin DOT local road inventory (WISLR) is a valuable resource for managing your local roads. Adding PASER surface condition ratings is an important improvement.

Averaging and comparing sections

For evaluation, divide the local road system into individual segments which are similar in construction and condition. Rural segments may vary from ½ mile to a mile long, while sections in urban areas will likely be 1-4 blocks

long or more. If you are starting with the WISLR Inventory, the segments have already been established. You may want to review them for consistent road conditions. Obviously no roadway segment is entirely consistent. Also, individual pavements will not have all of the types of distress listed for any particular rating. They may have only one or two types. Therefore, some “averaging” is necessary.

The objective is to rate the condition that represents the majority of the roadway. Small or isolated conditions should not influence the rating. It is useful to note special conditions on the inventory form so this information can be used in project design.

For example, some spot repairs may be required.

Occasionally pavement conditions will vary significantly. For example, short sections of good condition may be followed by sections of poor pavement conditions. In this case, it is best to rate the pavement according to the worst conditions and note the variation on the form.

The overall purpose of condition rating is to be able to compare each segment relative to all the other segments in your roadway system. On completion you should be able to look at any two pavement segments and find that the better surface has a higher rating.

Within a given rating, say 6, not all pavements will be exactly the same. However, they should all be considered to be in better condition than those with lower ratings, say 5.

Sometimes it is helpful in rating a difficult segment to compare it to other previously rated segments. For example, if it is better than one you rated 5, and worse than a typical 7, then a rating of 6 is appropriate. Having all pavement segments rated in the proper relative order is important and useful.

Assessing drainage conditions

Moisture and poor pavement drainage are significant factors in pavement deterioration. Some assessment of drainage conditions during pavement rating is highly recommended. While you should review drainage in detail at the project level, at this stage simply include an

▼ Urban drainage. RATING: Excellent



▲ Adequate rural ditch and good erosion control. RATING: Good

overview drainage evaluation at the same time as you evaluate surface condition.

Look at the roadway crown and check for low surface areas that permit ponding. Paved surfaces should have approximately a 2% cross slope or crown across the roadway. Rural

shoulders should have a greater slope to improve surface drainage.

Good drainage improves a pavement's ability to resist pumping, faulting and joint damage. Some new concrete pavements are being constructed with a special drainage layer and drain system to reduce water-related deterioration.

These systems require inspection and periodic maintenance.

You should also check curb and gutter, culverts, and storm drain systems. Storm drainage systems that are silted in, have a large accumulation of debris, or are in poor structural condition will also degrade pavement performance.

The T.I.C. publication, *Drainage Manual: Local Road Assessment and Improvement*, describes the elements of drainage systems, depicts them in detailed photographs,

and explains how to rate their condition. Copies are available from the T.I.C.

Planning annual maintenance and repair budgets

We have found that relating a normal maintenance or rehabilitation procedure to the surface rating scheme helps local officials use the rating system. However, an individual surface rating should not automatically dictate the final maintenance or rehabilitation technique.

You should consider safety, future traffic projections, original construction, and pavement strength since these may dictate a more comprehensive rehabilitation than the rating suggests. On the other hand, it may be appropriate under special conditions to do nothing and let the pavement fully deteriorate, then rebuild when funds are available.

Summary

Using local road funds most efficiently requires good planning and accurate identification of appropriate rehabilitation projects. Assessing roadway conditions is an essential first step in this process. This concrete pavement surface condition rating procedure has proved effective in improving decision making and using roadway funds more efficiently. It can be used directly by local officials and staff. It may be combined with additional testing and data collection in a more comprehensive pavement management system.



▲ Reshape terrace behind curb to restore drainage and prevent damage to curb and street.

RATING: Fair



► Flooding. Curb and gutter need reconstruction.

RATING: Poor

**Transportation
Information
Center
Publications**

Pavement Surface Evaluation and Rating (PASER) Manuals

Asphalt PASER Manual, 2002, 28 pp.

Brick and Block PASER Manual, 2001, 8 pp.

Concrete PASER Manual, 2002, 28 pp.

Gravel PASER Manual, 2002, 20 pp.

Sealcoat PASER Manual, 2000, 16 pp.

Unimproved Roads PASER Manual, 2001, 12 pp.

Drainage Manual

Local Road Assessment and Improvement, 2000, 16 pp.

SAFER Manual

Safety Evaluation for Roadways, 1996, 40 pp.

Flagger's Handbook (pocket-sized guide), 1998, 22 pp.

Work Zone Safety, Guidelines for Construction, Maintenance, and Utility Operations, (pocket-sized guide), 2002, 58 pp.

Wisconsin Transportation Bulletins

- #1 Understanding and Using Asphalt
- #2 How Vehicle Loads Affect Pavement Performance
- #3 LCC—Life Cycle Cost Analysis
- #4 Road Drainage
- #5 Gravel Roads
- #6 Using Salt and Sand for Winter Road Maintenance
- #7 Signing for Local Roads
- #8 Using Weight Limits to Protect Local Roads
- #9 Pavement Markings
- #10 Seal Coating and Other Asphalt Surface Treatments
- #11 Compaction Improves Pavement Performance
- #12 Roadway Safety and Guardrail
- #13 Dust Control on Unpaved Roads
- #14 Mailbox Safety
- #15 Culverts-Proper Use and Installation
- #16 Geotextiles in Road Construction/Maintenance and Erosion Control
- #17 Managing Utility Cuts
- #18 Roadway Management and Tort Liability in Wisconsin
- #19 The Basics of a Good Road
- #20 Using Recovered Materials in Highway Construction
- #21 Setting Speed Limits on Local Roads

PASER



Concrete Roads

Appendix D - 2025 Street Condition Prediction and Budget Tool

Inputs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Slab Replacement Budget	\$1,894,200.00	\$1,968,052.10	\$2,345,059.00	\$2,569,384.00	\$1,881,634.00	\$1,739,731.00	\$2,339,305.00	\$2,100,179.81	\$2,048,216.00	\$2,174,600.00	\$3,671,146.38	\$3,901,529.71	\$5,450,180.67
Actual Cost per sq. yd	\$53.30	\$54.31	\$59.80	\$59.22	\$57.88	\$58.49	\$62.76	\$61.29	\$58.51	\$63.46	\$110.50	\$80.90	\$71.33
Add'l Sq. yd. of Capital Improvement	-	-	16,849	19,137	-	-	-	-	-	-	-	-	-
Total sq. ft. of Concrete Replaced	319,846	326,136	504,576	562,717	292,563	267,678	335,464	308,396	315,056	308,405	299,007	455,706.00	687,671.75
Total sq. yd. of Concrete Replaced	35,538 SY	36,237 SY	56,064 SY	62,524 SY	32,507 SY	29,742 SY	37,274 SY	34,266 SY	35,006 SY	34,267 SY	33,223 SY	50,634 SY	76,408 SY
Average Rating (end of year)	8.13	8.11	8.10	8.09	8.06	8.02	7.98	7.94	7.89	7.83	7.84	7.85	7.90
Actual Average Rating (end of year)	8.19	8.08	8.13	8.17	8.20	8.21	8.23	8.11	8.00	7.82	7.89	7.91	7.91
Approx. Average Age of Network	12.93	14.14	13.60	13.15	12.82	12.71	12.49	13.82	15.01	16.83	16.14	15.94	15.94
% of Total City Pavement Replaced	1.22%	1.25%	1.93%	2.15%	1.12%	1.02%	1.28%	1.18%	1.20%	1.18%	1.14%	1.74%	2.63%
	0	1	2	3	4	5	6	7	8	9			
Average Rating at end of year 0 (2013)	8.19	← From GIS											
Approx. Average Age @ yr 0	12.93	← Calculated											
Polynomial Model	x^3	x^2	x	Constant									
Coefficient	-0.0003	0.0147	-0.2822	10	← From 2025 Analysis								
	a	b	c	d									
Proj. Construction Cost Inflation Rate for 2024	0.03	← Requires Input											