

PSI's headquarters is home to world-class engineering and research in industrial and transportation infrastructure. Our clients include governments, municipalities and industrial customers across North America and around the world.



*Engineering and implementing innovative solutions for highways, roads and municipal service delivery*

**TRANSPORTATION  
INFRASTRUCTURE**



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We believe  
in *innovation*,  
in *engineering*,  
in *execution*.

Backed by our leading science and engineering research, PSI Technologies sets the standard for superior, cost-effective solutions to help build and maintain the trillions of dollars in transportation infrastructure assets that keep the modern world moving.

PSI delivers full transportation infrastructure solutions as a stand-alone provider or by seamlessly integrating our services with partners in government and industry.

PSI research and technologies deliver efficient fully integrated infrastructure packages, right from initial research, design and engineering, to building and maintaining user-ready systems across the transportation infrastructure spectrum. Whether it's highways, streets, rail lines, rapid transit systems, airstrips, intermodal transport or underlying municipal services, PSI offers durable, cost-effective engineered solutions.

Innovation and integration make us a partner of choice. Our turnkey solutions improve delivery efficiency of major construction projects, sharpening our clients' budget effectiveness and competitive edge.

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**PSI offers complete transportation infrastructure solutions including:**

- Applied Research and Development
- Conventional Laboratory Materials Characterization
- Mechanistic Materials Characterization
- 3D Structural Modeling
- Road Material Recycling
- Pavement Preservation Systems
- Road Asset Management
- Field Sampling Testing

## APPLIED RESEARCH: THE FUNDAMENTALS OF PERFORMANCE

What causes a material to perform or underperform in the field? At PSI's material research laboratory, we apply rigorous scientific analysis to materials and processes to accurately predict performance of our systems in the field. Our central lab is certified by the Canadian Council of Independent Laboratories in a full range of conventional as well as mechanistic characterization of materials for road infrastructure and heavy industrial applications. We also deploy fully-equipped mobile labs for quality control field testing to ensure end product quality is achieved during construction.

### Materials Testing Services include:

- Soils and Aggregate Materials
- Asphalt Concrete
- Asphalt Cement Testing (including Pen Vis and SHRP performance grading)
- Mechanistic Materials Characterization (including non-linear multiaxial frequency sweep)
- Portland Cement Concrete
- Soil Modification and Stabilization
- Microsurfacing Systems
- Geological Rock
- Advanced Composite Systems
- Metals Characterization and Metal Matrix Composites
- Field Quality Control and Quality Assurance

What we learn in the lab, we test in the field and deliver to the client. In modern engineered systems, **the fundamentals of science are the fundamentals of performance** - on this we will not compromise.



### A TEAM OF INNOVATORS

PSI President and Chief Technical Officer Dr. Curtis Berthelot (P.Eng.) earned his Doctorate in Civil Engineering specialized in Materials Science. He has built a team of more than 100 engineers, geologists, lab technicians and industrial operators with decades of experience working in transportation infrastructure.



## TRANSPORTATION INFRASTRUCTURE MATERIALS

Transportation infrastructure engineering principles have evolved over the past century of learnings, many very costly. However, from these learnings, the transportation infrastructure profession has established a broad suite of tried and true infrastructure systems and principles from which to design, procure and construct transportation infrastructure. PSI believes in these learned principles to our core. We have a highly advanced conventional materials testing lab certified in soils, aggregates, asphalt and concrete. We can perform any standard specified test in these areas to meet the needs of our clients.

PSI's advanced mechanistic laboratory and modeling systems are equipped to directly correlate conventional road material test properties to more scientific mechanistic materials properties. Our engineering systems provide a unique "bridge" from tried-and-true principles to future advanced scientific methods for designing and maintaining transportation infrastructure.

What we learn in the lab, we test in the field and deliver to your clients.



## FUTURE IN TRANSPORTATION MATERIALS CHARACTERIZATION AND DESIGN

PSI is a pioneer in mechanistic materials characterization and numerical structural modeling to predict transportation infrastructure performance. Given the complex nature of road materials and field state conditions, mechanistic characterization and accurate performance prediction modeling is no easy task. Over the past two decades, PSI has developed and perfected reliable methods to characterize and specify road materials systems based on the fundamentals of engineering science and engineering mechanics. History will show the use of advanced engineering principles will “pave the way” for providing cost-effective future transportation infrastructure systems.

## SHARING EXPERTISE

Sharing expertise is an integral part of developing innovative and sustainable solutions to improve performance in the transportation infrastructure profession. PSI’s engineers have published hundreds of peer-reviewed scholarly papers of advanced engineering practices, which can be accessed at [psitechnologies.ca](https://psitechnologies.ca).

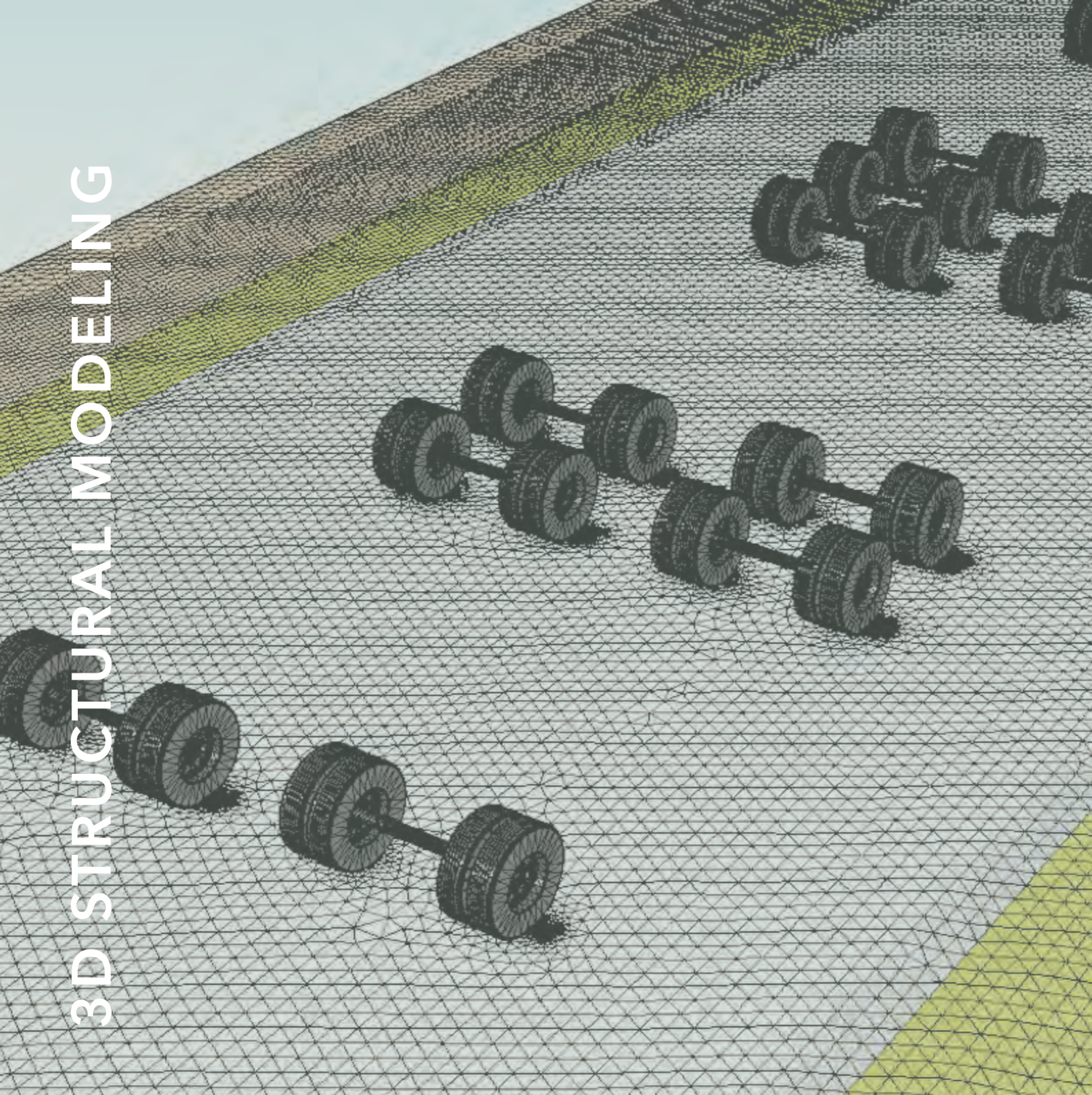
We are also proud to showcase the advanced science of PSI with tours and training sessions for our clients at our laboratory facilities. Advanced material characterization is the heart of PSI’s innovative research, development and in-the-field systems.



## PSI-U

For years, we’ve been proud to showcase the advanced science of PSI to our clients with tours of our laboratory facilities. Inspired by their feedback and questions, we have established PSI-U, where clients can come in, see our processes, receive training and technical knowledge on PSI’s innovative research, development and in-the-field systems.

3D STRUCTURAL MODELING



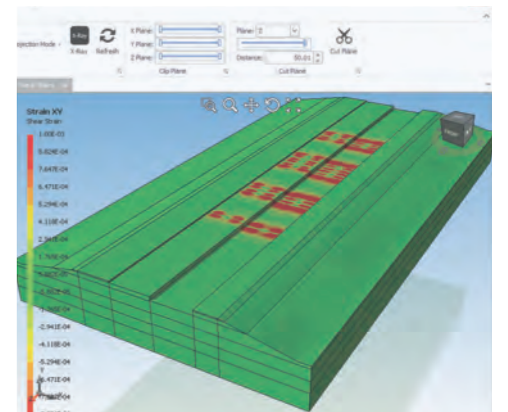
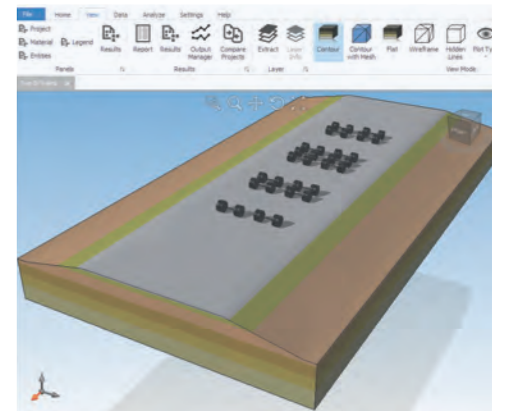
PSISuite3D™  
INFRASTRUCTURE MODELING

Over the past decade, PSI Technologies has developed advanced mechanistic materials characterization and true three-dimensional numerical modeling techniques for the transportation sector. These efforts have created a powerful suite of world-class modeling tools called PSISuite3D™. PSISuite3D™ predicts pavement performance such as cracks and rutting over the short and long term of a road's lifecycle - powerful information for preventing deterioration and for ongoing infrastructure lifecycle budget planning.

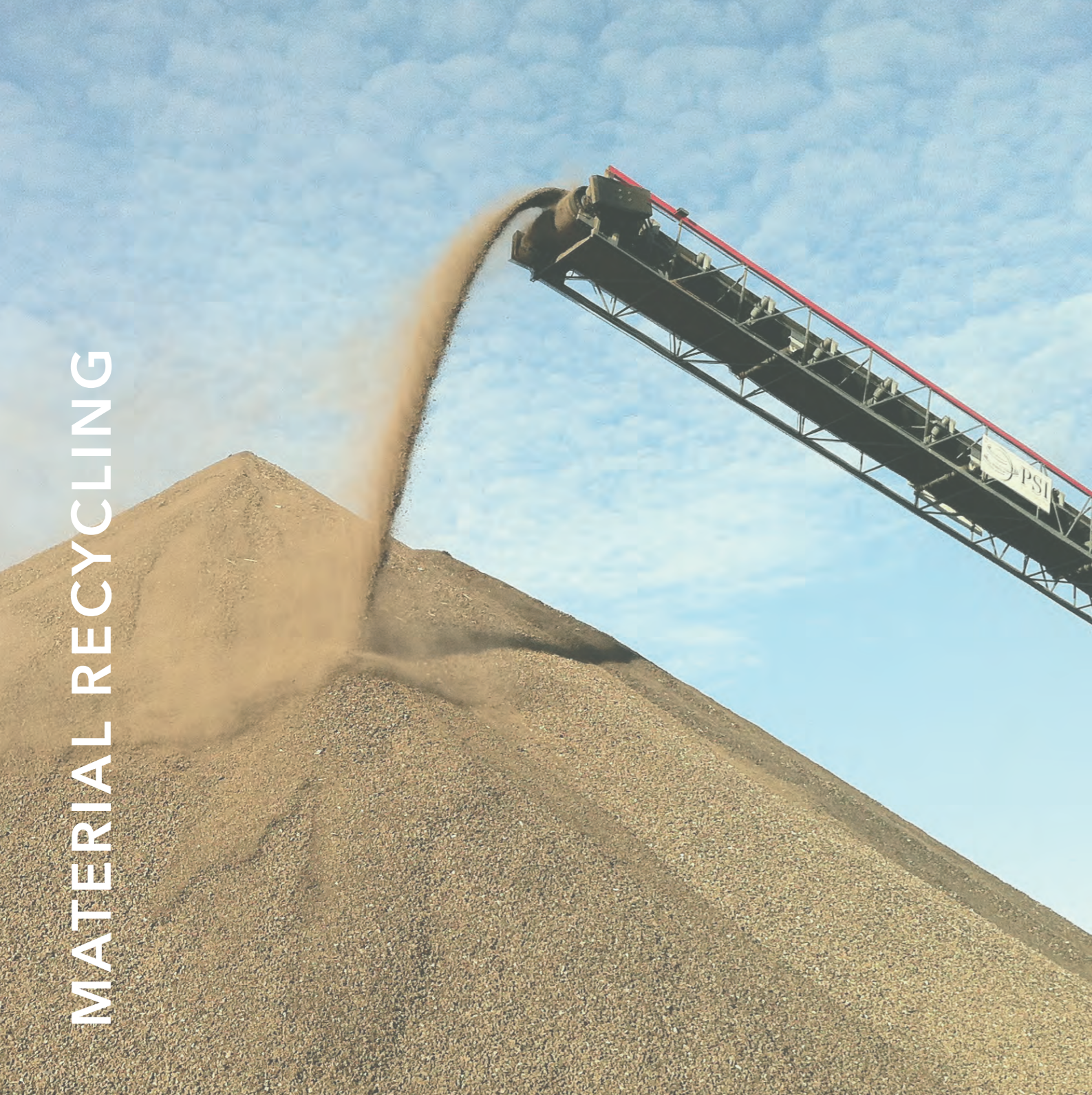
**PSISuite3D™ includes:**

- PSIPave3D: Pavement Structural Analysis
- PSICulvert3D: Culvert Analysis
- PSIUtility3D: Urban Buried Infrastructure Analysis
- PSIHeavyHaul3D: Custom Heavy Haul Analysis
- PSIGeosynthetics3D: Geosynthetic Layers Analysis
- PSIDrainage3D: Drainage System Analysis
- PSIMultiscale3D: Micro- and Macro-Scale Simulations
- PSIBackCalc3D: Viscoelastic Layer Moduli Backcalculation Analysis
- PSIPad3D: Heavy Industrial Pads Analysis

Using the PSISuite3D™ modeling system, alternative designs can be tried and tested before construction, identifying problems in virtual space and preventing costly real-world building and maintenance issues.



# MATERIAL RECYCLING



## RECYCLE, RE-USE, RE-PAVE

PSI Technologies pioneered the use of mechanistic engineering material characterization testing to establish performance-based design specifications for recycled concrete and asphalt materials in road structures. Harnessing our scientific expertise in materials, we compared performance of engineered recycled materials with that of traditional aggregate materials. Engineered recycled materials can significantly outperform conventional road materials when processed and constructed properly. This research allowed us to establish the specifications needed for industry to best use recycled materials for road infrastructure applications based on a scientific fundamentals framework. We have set the standard for use of recycled materials for transportation infrastructure, with many road agencies using our engineered recycle systems.

Recycling not only reduces cost, it lessens pressure on non-renewable aggregate resources. It also diverts significant volumes of concrete and asphalt rubble and similar waste away from landfills.

Engineered uses of waste materials also significantly increase the “fourth bottom line” in infrastructure financial assessment.





## INTEGRATED PAVEMENT PRESERVATION SOLUTIONS FOR UNIQUE AGENCY INFRASTRUCTURE CHALLENGES

Every transportation infrastructure project presents unique challenges of soil types, water conditions, materials and climatic conditions. Using our advanced modeling tools and materials testing capabilities, PSI Technologies has developed a broad spectrum of pavement preservation solutions tailored for specific locations and conditions. This approach goes well beyond simple resurfacing, producing transportation infrastructure systems that perform over the long term, saving costs and better serving our clients.



## PAVEMENT PRESERVATION SYSTEMS

Transportation infrastructure represents enormous public investment and these assets are under constant attack by traffic, climate and time. As pavements age, asphalt gets brittle, ruts form and water seeps into the substructure through cracks. Freeze-thaw cycling coupled with traffic loading can induce damaging strains that literally tear the road apart. As roads deteriorate with time, there is a critical window for preservation treatments to avoid more extensive - and expensive - repair or even replacement.

PSI Technologies offers a broad suite of advanced cold-surface preservation systems as a cost-effective way to replenish the road's protective armor. When applied at the correct time, this technology can intercept and even stall the aging process, extending the life of the road asset with a new, smooth surface for its users. PSI Technologies has developed more advanced solutions such as rut-fill and fibre-reinforced surfacing systems to restore more extensively damaged road surfaces to like-new condition.

## FROM DESIGN THROUGH DELIVERY

PSI Technologies owns and operates a large fleet of pavement preservation equipment as well as advanced laboratory and field survey equipment. This is the business end of PSI - where research and development gets put into action for superior, cost-effective results. Services include full turnkey engineering solutions from field performance surveys and sampling, materials testing and design, to construction and quality assurance testing for road preservation systems.





## FIELD SAMPLING AND QUALITY CONTROL/ASSURANCE TESTING

What if you could assess the condition of a roadway simply by driving on it? PSI brings the world's best practice in non-destructive transportation asset assessment with world class technologies. Through a partnership between PSI Technologies and Roadscanners Oy of Finland, PSI's road survey system consists of an extensive suite of integrated equipment sensors including ground-penetrating radar, lidar, laser and thermal imaging—all capable of gathering data at highway speeds. PSI then can "target" non-destructive structured testing and sample coring based on the spatial variance in the road structure properties.

When integrated with PSI's advanced laboratory testing capabilities, field sampling, road structural modeling and performance prediction profiling, the PSIPave System will allow road agencies to assess and predict future pavement condition quickly and efficiently, identifying areas that need preventative preservation before they become more expensive problems. The PSIPave data and predictions cost effectively inform road agency decision makers on the most appropriate maintenance and preservation treatment options to optimize their limited budgets across their road network assets.





### ENGINEERING A BETTER FUTURE

Communities across North America and around the world are increasingly embracing social and environmental responsibility. PSI shares these values and brings a corporate commitment to technical innovation, safe and efficient construction and environmental sustainability. PSI continuously searches for solutions that are socially and economically responsible.

Where possible, we engineer the use of cold paving systems, reclaimed and recycled materials – providing off-site crushing of concrete and asphalt to specific material properties, full-depth reclamation of road materials, and shredding of wood and plastic recyclables, all processed to a scientific based engineered specification for optimal road performance.

### OUR COMMITMENT TO SAFETY AND EXCELLENCE

PSI is committed to creating, maintaining and promoting a safe and healthy work environment for our workforce and our communities. We actively pursue a goal of zero lost-time accidents and have maintained an ISNetworld 'A' Rating and a Certificate of Recognition from the Saskatchewan Construction Safety Association.

