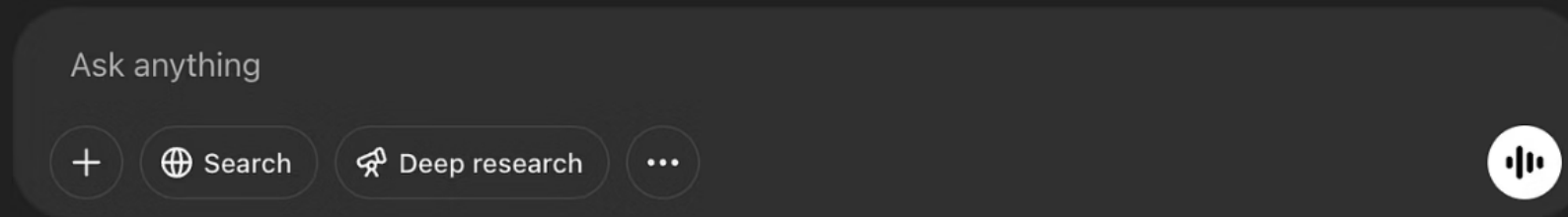


Ready when you are.



Leveraging AI in Transportation Engineering

Productivity, Expertise, and Ethical Considerations

Jon Kostyniuk, P.Eng.
Senior Transportation Engineer and Planner
JK Traffic Solutions Inc.
ITE Canada, Halifax
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Why This Topic Matters



AI Transforms Work

AI is a powerful tool that can **augment transportation engineering**, but it **requires oversight** and careful integration.



Think: AI as EIT

AI can be a **helpful "junior engineer"** - **fast, efficient, but not yet fully trained or experienced**. It needs human supervision.



The Journey Ahead

We'll explore **real-world engineering uses, ethical and legal considerations**, and what the future may hold for AI for transportation professionals.



What Your Peers Are Saying About AI



Current AI Applications

"We are building new products and workflows with it. It will help build new consulting lines."

- Idea generation for complex problems
- Automation of repetitive tasks
- Drafting preliminary memos and reports
- Research assistant



Key Concerns

"AI undermines critical thinking — we must train engineers, not replace them."

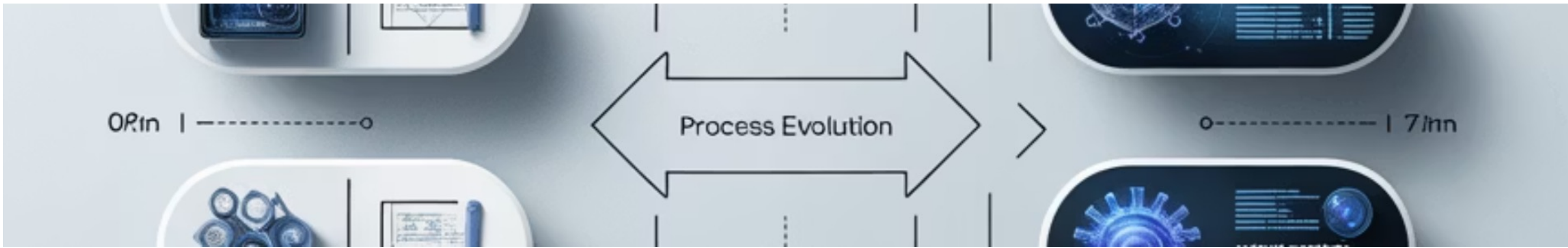
- Skill atrophy and over-reliance
- Accuracy of AI-generated outputs
- Ethical considerations in application
- General vs. trained AI models



Organizational Readiness

"Used haphazardly person-to-person."

- 65% report having an AI strategy (vs. 15% employees hearing a clear plan, Gallup 2024)
- Others cite disjointed implementation
- Majority see productivity potential with proper guidance



Streamlining Engineering Tasks

Conventional

- 🔍 Search for information
- ✍️ Draft content manually
- 🧱 Format and structure output
- 🔧 Revise and iterate
- ✅ Due diligence and approval

AI-assisted

- 🤖 Prompt the AI (frame task)
- 📄 Review AI-generated output
- ✅ Validate against sources
- 🎯 Refine and contextualize
- ✅ Due diligence and approval



Collaborative

Workflow more efficient with feedback, AI improves



Outcome

Faster cycles, more time for engineering judgment

Elevate Your Expertise with AI

AI isn't here to replace you, it's here to amplify what you do best!



Know your niche

Identify your unique transportation engineering strengths that AI can enhance.



Use AI as a superpower

Let AI handle more repetitive tasks while you focus on high-value analysis.



Stay human in the loop

Your expertise validates AI outputs for safety and ethical compliance.



Keep learning

Successful AI integration requires ongoing education and leadership commitment.

General Use vs. Custom Models

	General Model (e.g. ChatGPT)	Custom Model (e.g. My GPT)
Purpose	Broad, general knowledge	Specialized, topic-focused knowledge
Experience	Answers as a well-read assistant	Tailored, expert-level search
Sources	Trained on wide-ranging public data	Built with domain-specific materials
Best At	Summarizing concepts, general queries	Providing authoritative responses
Adaptability	Flexible across many topics	Focused expertise, understands professional language



Briefly, please give me a table of minimum timings for traffic signal phases/displays. Thx

Here is a concise summary table of minimum traffic signal phase/display timings as provided in the Ontario Traffic Manual, Book 12 (Traffic Signals):

 Table: Minimum Signal Interval Times (Standard Displays)

Signal Display Type	Preferred (s)	Minimum (s)
Circular Green (roads < 80 km/h)	10.0	7.0
Circular Green (main road ≥ 80 km/h)	20.0	15.0
Circular Green (side road ≥ 80 km/h)	10.0	7.0
Circular Amber	3.0	3.0
Protected Green Arrow (in protected/permissive phasing)	7.0	5.0
Amber Arrow Clearance (protected/permissive)	3.0	2.0*
Green Arrow (Fully Protected Left/Right)	7.0	5.0
Amber Arrow (Fully Protected)	3.0	3.0
All-Red Interval	1.0	1.0
Transit Priority	5.0	3.0
Pedestrian Walk	7.0	5.0
Pedestrian Clearance (Flashing Don't Walk)	5.0	3.0

*Note: NEMA controllers have a 2.7 s minimum for amber clearance.

Source:

According to Ontario Traffic Manual, Book 12 – Traffic Signals, Section 3.7, Table 3 (2024 Edition), these values represent the preferred and minimum durations for each type of traffic signal indication.

Validation Status: **Full Match**

How AI Helps Engineers Today

Draft documents

Memos, reports, correspondence, proposals

Standards, guidelines, codes lookup

OTM, ITE, MUTCD instantly

Data preparation

Tables, TIAs, warrants, calculations

Strategic planning

Workshops, core statements, peer review



Demo: AI + ITE Trip Generation



Helps select appropriate land use

Assists and seeks clarity in determining accurate land use for developments



Land Use Lookup

References appropriate land use code and performs data lookup (i.e. average rate, equation, statistics, etc.)



Performs calculations

Automates trip generation calculations for efficiency and justifies the approach based on ITE guidelines



<https://youtu.be/R2LfJhdfE-E>

Demo: AI + Visualization



“Try generating an image to add a bicycle signal head to the arm of this primary signal.”



Demo: AI + OTM Sign Recognition



Identifies and Describes Signs

Recognizes official OTM signs from images, providing standard code, design features, and description.



Verifies Compliance and Validity

Checks if the sign matches standards, highlights deviations, and confirms legal status.



Finds Closest Ontario Equivalent

When a sign is not recognized, it suggests the most relevant sign for Ontario compliance.



<https://youtu.be/27a2Ebt3xMA>

Use Judgment, Not Autopilot

AI is like an EIT

Fast and eager, but needs supervision and lacks experience and professional judgment

Your stamp, your responsibility

Engineers remain accountable for all work, AI-assisted or not

Oversight is mandatory

Due diligence can't be delegated to algorithms, it's engineering best practice

First drafts, not final sign-offs

AI accelerates but doesn't replace professional due diligence

Not all tasks are AI-ready (and that's okay)

Recognize when traditional methods remain more appropriate




Only one of you can approve the work

IP Boundaries and Legal Risks

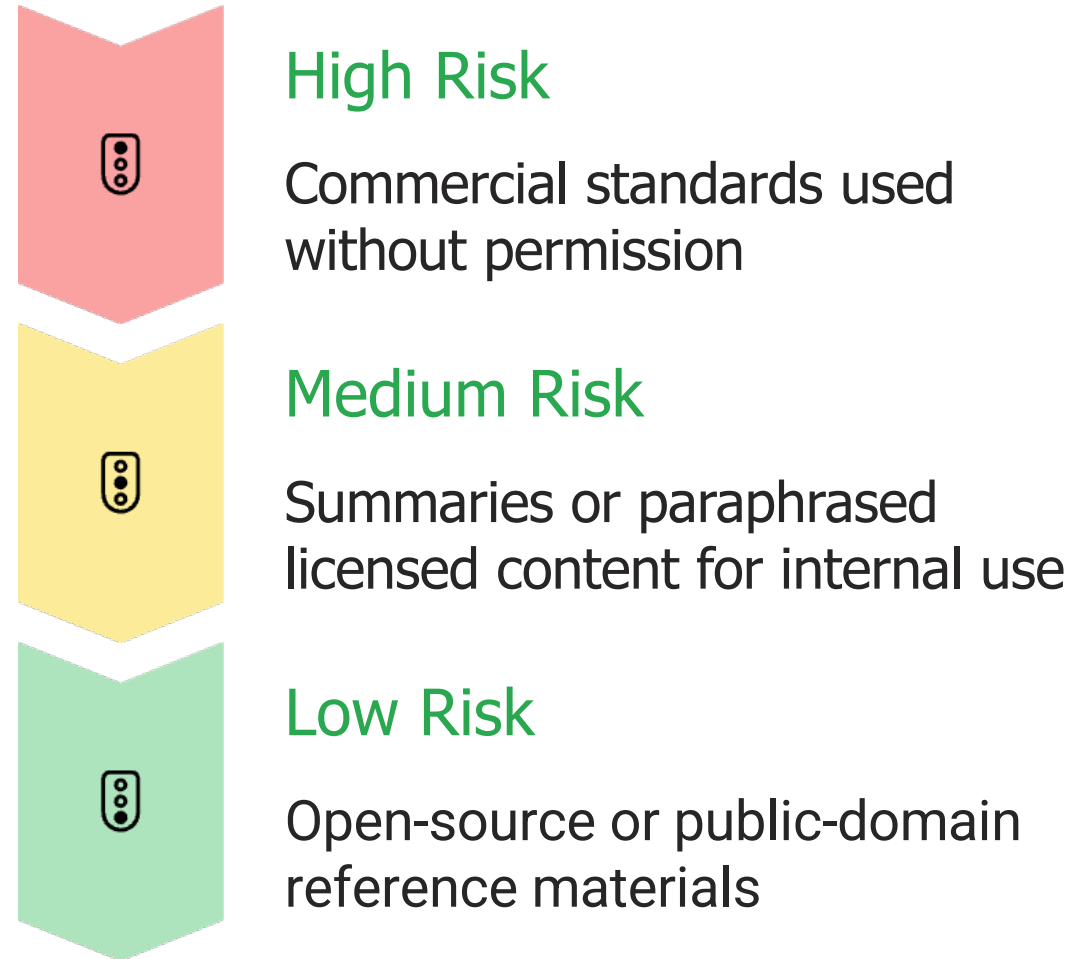
 **Engineers rely on standards**, AI models do too (e.g. OTM, MUTCD, TAC, etc.)

? Fair use vs. licensing: training AI on manuals may cross legal lines

 Use **public or open-source** content when possible

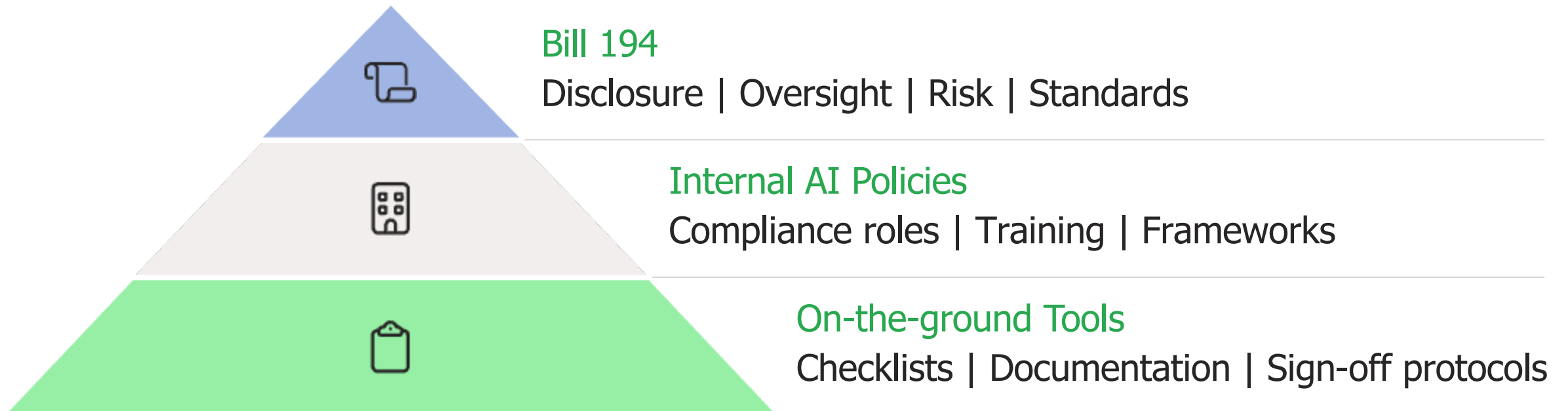
 **Internal use** (e.g. proof-of-concept, AI supplement, etc.) is safer than public sharing

 When in doubt, **seek legal guidance**



Ontario's AI Law: What Transportation Engineers Need to Know

Bill 194 passed in November 2024 applies to all Ontario public-sector entities. Consultants working with government clients need to understand these requirements.



Disclosure is mandatory when AI is used in public-sector systems. Human oversight cannot be bypassed. Organizations must implement accountability frameworks and risk mitigation plans.

AI Use in Proposals, Deliverables, and Daily Practice

RFPs may require AI transparency clauses soon



Include disclosures in reports

Train staff by role: engineers, technologists, admin

Compliance Checklist


- ✓ Clear internal AI policy
- ✓ Staff trained on risks
- ✓ AI use is documented in deliverables
- ✓ Public-sector expectations reviewed



From Assistants to Agents: AI's Next Leap

 AI tools are evolving into **autonomous agents**

 **Agents will respond** to prompts, ask clarifying questions, and complete workflows

 **Junior or administration-level tasks** (e.g. report drafting, analysis, coordination) are becoming increasingly automated.

 Engineers should focus more on **orchestration, oversight, and ethics**

2025 Roles



EIT



Analyst



QA Reviewer



Team Lead

2027+ Roles



Prompt Engineer



AI Auditor









Trust Officer



AI Workflow Coordinator

Shaping the Future: Questions for Our Profession

-  How do we mentor the next generation if AI automates entry-level work?
-  How do we stay sharp and build expertise when AI handles the routine?
-  How will we define and protect the "human" value (vs. AI) in our profession?
-  Will we own our AI tools or rent intelligence on demand?
-  What AI governance will earn public trust in our plans, policies, and designs?
-  Who is accountable when AI makes a critical error in public infrastructure?

Thank You!

Jon Kostyniuk, P.Eng.

Senior Transportation Engineer and Planner

JK Traffic Solutions Inc.

jon.kostyniuk@jkts.ca

+1.226.448.5954

CONNECT

