

Norm Engineering Conference 2026

# Innovating the building permit request:

Enhancing AI quality through norm engineering - a use case in flanders



**Stijn Vandeweyer**  
Deloitte



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Deloitte

**Deloitte.**



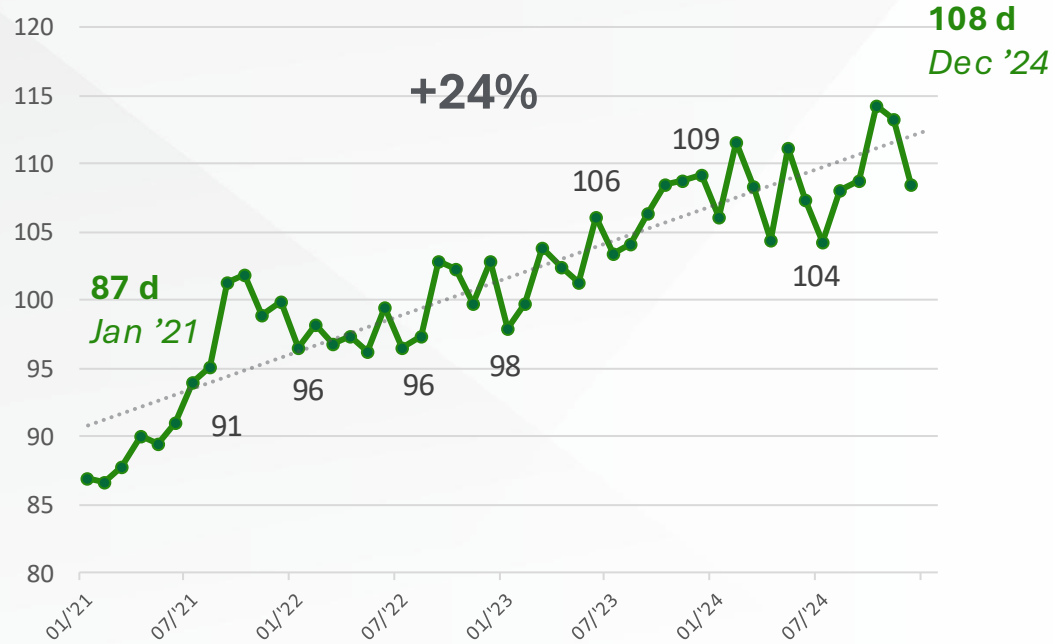
# The future of permits Unlocking growth with RegAI

Norm Engineering Conference, 12 March 2026

# Increasing permit regulations: barriers to citizens, companies and economic growth

## Throughput time of building permits (“omgevingsvergunningen”)

(Jan '21 – Dec '24)



Bron: Omgevingsloket Rapportering, Departement Omgeving



*"Unfortunately, a permit process today is often synonymous with a real obstacle course. The tangle of regulations and the many local regulations make a permit application very complex."*

**Jean-Pierre Waeytens, Bouwunie**



*"The main reason is the ever-increasing millefeuille with layers full of rules, regulations, guidelines and regulations that a project must comply with. [...] The number of mutual relationships and interferences of rules is increasing enormously, which also increases the chance of errors or contradictions accordingly."*

**Lorenzo Van Tornhout, Developer and visiting professor KU Leuven**

**Een boom vellen in uw tuin? Eerst het papierwerk, dan de kettingzaag**



De bomen die u omhakt, moeten doorgaans gecompenseerd worden met nieuwe aanplant. **In Vlaanderen velt u niet zomaar een boom in uw tuin. U moet eerst de aanvraagprocedure doorlopen en afwachten of u al dan niet de vergunning krijgt.**

**Klachtenregen nadat 20.000 bewoners 'onbegrijpelijke' brief ontvangen: "Sommigen dachten dat ze hun tuinhuis moesten afbreken"**

**'Tussen de eerste en de derde vergunningsaanvraag voor mijn renovatie heb ik meer dan een jaar verloren'**



Pictio verloor meer dan een jaar door het trage verloop bij de vergunningsaanvraag. ©ANTONIN WEBER / HANS LUCAS



**The number of building/environmental permits is high and the majority are handled by local authorities...**

**82.230**

Permit applications in Flanders in 2024

**96%**

are handled by local authorities

**88 days**

average throughput time

**... with a significant impact on their employees**

Of all local environmental and environmental officials in Flanders, the following states:

**94%**

said that the workload was 'often, very often or always' too high.

**98%**

said that the high workload is due to the complexity of files.

**95%**

that the high workload is due to the complexity of regulations

Source: Ghent University research\*



*"Because environmental officials are absorbed by permits, there is no time, space or energy left to work on a long-term plan. That is precisely where the crucial role and importance of spatial planning lies."*

**Guy Vloebergh, professor of urban planning at the University of Antwerp**



*"Nothing really needs to go wrong, or we won't be able to cope with the workload. [...] The reason is rather that insufficiently substantiated permits are nevertheless granted."*

**Filip van Acker, chairman of the Council for Permit Disputes**

## Gemeenten niet opgewassen tegen complexere vergunningverlening



©Tim Dirven

**OLAF VERHAEGHE**  
28 december 2023 01:00

Gemeenten slagen er niet in voldoende expertise over ruimtelijke ordening in huis te halen, blijkt uit een nieuwe studie. De druk waar lokale diensten Stedenbouw onder kreunen, bedreigt de deskundige en onafhankelijke beoordeling van bouwdoSSIERS en de ontwikkeling van een beleid op langere termijn.

## "Vlaamse overheid geeft slechts in 1 op 5 gevallen advies omgevingsvergunning"

28.11.2023



De Vlaamse overheid geeft slechts in een op de vijf gevallen advies voor een omgevingsvergunning. Dat blijkt dinsdag uit cijfers die Vlaams Parlementslid Bruno Tobback opvroeg bij minister van Omgeving Zuhal Demir.

\*Voets, J., Schraepen, P., Smolders, C., Van Herck, B., Van Hoof, W., & Dezeure, K. (2023). GOA: a bottleneck profession? Research into the staffing of the local environmental services and the workload of the municipal environmental officials and their employees.

**The regulations and the process surrounding permits are complex and time-consuming, both for citizens, entrepreneurs and civil servants**

*"Beyond the individual level, **permits play a critical role in the broader economy.** They enable businesses and entrepreneurs to develop new facilities such as factories, warehouses, and offices, which are vital for economic growth and job creation."*

**Jo Brouns** – Flemish Minister of Agriculture and Environment

**"Preliminary consultation is a right"**

Gemengde Commissie Vergunningen (2025)

*What do Flemish citizens think?*

**5.5/10** Average Score

**-61.3** Net Promoter Score

*300 Belgian citizens – Sept 2025*

*What does the Flemish government think?*

**Top 5 AI priority for the Flemish government**

*Survey AI network – March 2025*

**1. Long wait times and slow turnaround time**

Respondents often indicate that the process takes far too long, with long wait times for approval and feedback. This leads to frustration and uncertainty about the status of the application.

**2. Lack of clarity and complexity of the process**

Many people experience the permit process as complicated, unclear and bureaucratic. There is a lack of clarity about which documents are required, which steps must be followed and what exactly the rules are.

**3. Poor communication and lack of follow-up**

There are many complaints about difficult communication with municipal services, contradictory or incorrect information, and the lack of a permanent contact person who can supervise the file.

**4. A lot of red tape and paperwork**

Collecting and submitting all the necessary documents is perceived as cumbersome and time-consuming. Some respondents indicate that they had to figure out a lot themselves and that the process is therefore difficult and frustrating.

**5. Problems with digital systems and online platforms**

The digital application platforms are sometimes experienced as impractical, unclear or technically difficult. This makes it difficult to submit documents and track the application.

**QUESTION 3**

What do you think went **less smoothly** in the permit process?



- The Nzyme is a **space and format for strategic sessions**, with the objective of ‘making the best possible human decisions. An enzyme or catalyst accelerates a reaction between elements without changing itself.
- Technologically supported **hybrid environment**
- **In-depth industry expertise** combined with **interpersonal dynamics** – sharing relevant insights and developing solid solutions and plans
- Relevant aspects: **technical knowledge and expertise, dynamics between people, decision-making and result orientation, resilience**
- Average customer score: **9.4/10**



# Deloitte NZYME – a north star for the future of permits



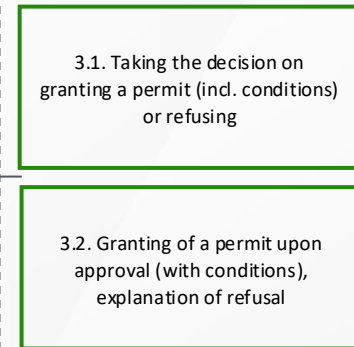
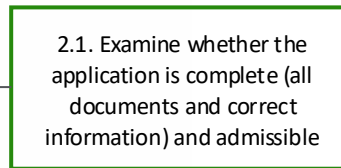
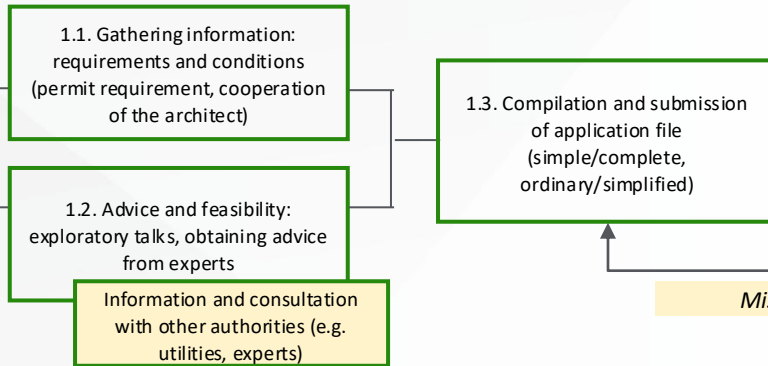
# Evaluating end-to-end processes across jurisdictions with AI-driven enhancements

## 1. Preparation: preparing and submitting an application

## 2. Processing: examination of completeness, admissibility & assessment of the application

## 3. Decision-making: deciding and granting a permit

The applicant wishes to carry out an action for which a permit is required



AI potential

### PERMIT PILOT:

Online coach who guides with advice, drafting and submitting a file. Based on information entered by the applicant, the Permit Pilot does:

- Permit check (permit required or not)
- Selection of relevant regulations and assessment frameworks
- Retaking previously delivered information to the community (Only Once)
- Giving suggestions on other permits
- Simulating the probability of obtaining a permit including points of attention
- Impossible to submit in case of incompleteness

Result: more clarity and error-free completed files, less time investment by the applicant, better quality files for follow-up steps, relief for local authorities, more personal advisory function for complex target groups and files possible

### COMPLETENESS AND ADMISSIBILITY:

- Classifying documents
- Check deadline, address within municipality where submitted, payment completed, ...
- (In the previous step, avoid as much as possible that incomplete or inadmissible can be submitted)

### CONTENT ASSESSMENT:

- Support with the substantive assessment, drafting of a proposal based on an assessment against the previous selection of relevant regulations and assessment frameworks (spatial implementation plans, sectoral plans, advice)

### PUBLIC CONSULTATION:

- Categorizing and analyzing input
- Provide an overview of the most common complaints (analysis of database complaints)
- Calculating SROI to speed up public inquiry

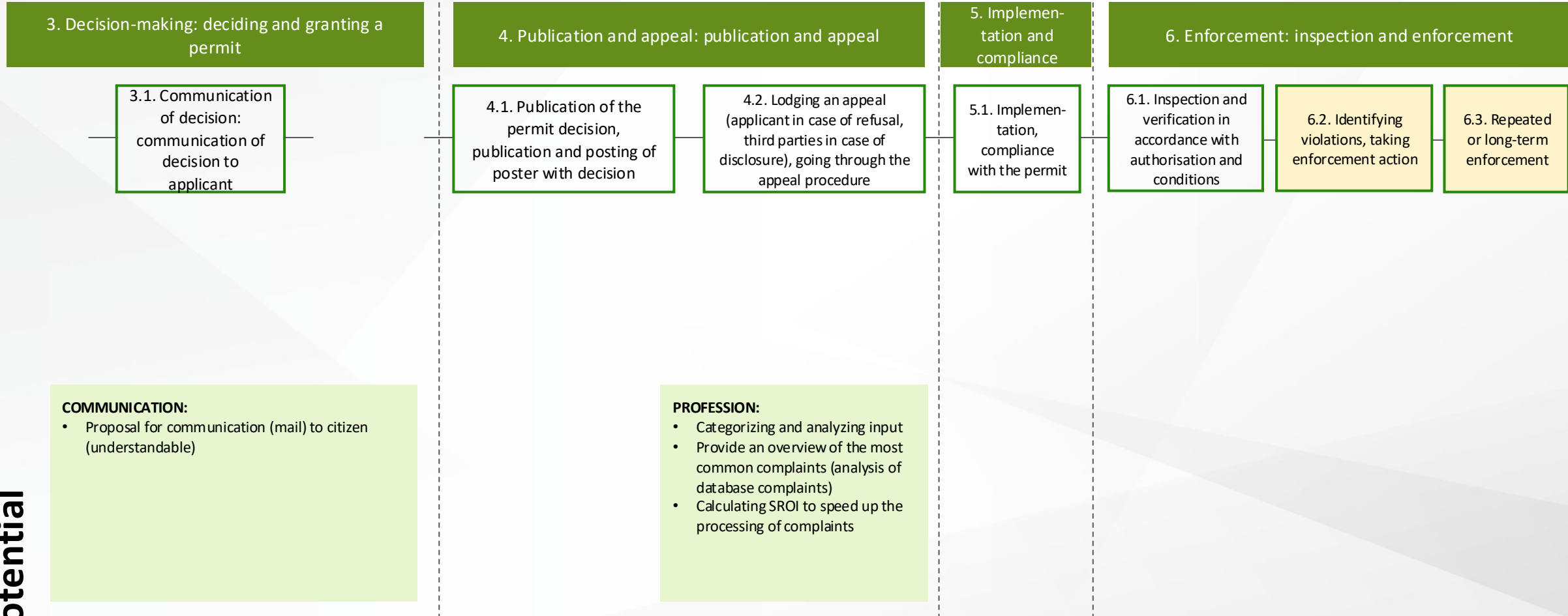
### DECISION:

- Preparing a note for the Board

### DATABASE:

- Creation of a database with all conclusions/assessments & database conclusions relevant for substantive assessment

# Evaluating end-to-end processes across jurisdictions with AI-driven enhancements



**COMMUNICATION:**

- Proposal for communication (mail) to citizen (understandable)

**PROFESSION:**

- Categorizing and analyzing input
- Provide an overview of the most common complaints (analysis of database complaints)
- Calculating SROI to speed up the processing of complaints

**GENERAL:**

- Capture and reuse data relating to patrimonial documentation (reuse of previously delivered and known data from a VO + other levels of government broad perspective)
- Monitoring policy and management data dashboard with filter by municipality

AI potential

## Flanders Hackaton – 13-15 October 2025

AGENTSCHAP  
DIGITAAL VLAANDEREN

Home Onze diensten en platformen Vlaamse digitale strategie Over ons

Nieuws

### Doe mee aan de Vlaanderen Hackathon 2025: samen hacken voor een slimmere toekomst

Nieuwsbericht • 20 mei 2025

In aanloop naar de Trefdag Vlaanderen Digitaal 2025 nodigen Digitaal Vlaanderen, PIO, VLAIO en Sandbox Vlaanderen u uit voor de Vlaanderen Hackathon 2025, een driedaags innovatief event dat dit jaar plaatsvindt op 13, 14 en 15 oktober.



**Jo Brouns** • 1e

Vlaams minister van Omgeving & Landbouw

1 w • 🌐

Proficiat aan Deloitte met het winnen van de Vlaamse hackathon!

Het thema van deze editie raakt de kern van een van onze grootste uitdagingen: hoe kunnen we de vergunningsprocedure sneller, eenvoudiger én intelligenter maken – voor zowel indieners als onze ambtenaren – met behulp van artificiële intelligentie. Een inspirerende oefening die toont hoe technologie kan helpen om tijd vrij te maken voor de écht complexe dossiers, waar menselijke beoordeling het verschil maakt.

De inzichten uit deze hackathon sluiten naadloos aan bij de oefening die we momenteel voeren rond de Gemengde Commissie Vergunningenbeleid. Want een efficiënt, robuust en transparant vergunningsbeleid is de beste garantie voor onze toekomst – voor ondernemers, burgers én onze leefomgeving.

De afgelopen weken hadden we al boeiende contacten naar aanleiding van deze Hackaton. De technologie oogt veelbelovend. We kijken ernaar uit om verder van gedachten te wisselen en samen te onderzoeken hoe we zulke innovatieve concepten ook op het terrein kunnen realiseren. Zo maken we het verschil zowel voor indieners van vergunningen als (lokale) overheden die hiermee aan de slag moeten.

[#HackathonVlaanderen](#)

[Deloitte Digitaal Vlaanderen](#) [Departement Omgeving VLAIO](#) [Sandbox Vlaanderen](#) [Stijn Vandeweyer](#) [Vergauwe Jeroen](#) [Sara Maes](#) [Matthew Gracie](#) [Florian Géron](#)



## We apply AI and other technological advancements to transform the permitting process

We use technology not only to automate existing processes, but also to **redesign the process.**

*"The goal is to **automatically support 80% of permit assessment**, so that we can focus on the 20% where human intervention offers significant added value."*



**Deloitte Nzyme Session - 30/09/2025**

With representatives of Flemish and local Governments, and other stakeholders

## Our solution uses three concrete technologies

### Norm Engineering

Translates complex regulations into a **format (FLINT with actions, facts and obligations)** that can be understood by both humans and machines, creating a **digital twin** of regulation.

FLINTs using GPT-4o

### Digital Workflow

Leverages existing systems and data sources to make the **process more efficient** and streamlined.

React, Vite, FastAPI, ...

### Agentic AI

Autonomous AI agents **automate** routine tasks and provide **decision support**.

LangGraph, LLMs, ...



## Norm Engineering

Norm Engineering creates an official plain language (and **machine readable**) version of regulatory documents by presenting it in terms and structures that can be more readily understood by the non-legal community.

## FLINT framework

FLINT (Formal Language for the INTERpretation of Normative Sources) is a framework and open standard representing a source of norms supporting Norm Engineering, and structures sections of regulations into **Acts, Facts, and Duties (FLINT Frames)**.

## FLINT

### Art. 52 Landscaping of gardens

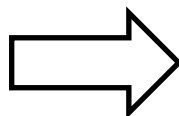
§1. The garden should be considered as a space with a green character.

§2. Gardens include a minimum area of living greenery:

- gardens with an area of up to 50m<sup>2</sup> consist of at least 1/3 living greenery;
- gardens with a surface area between 50m<sup>2</sup> and 100m<sup>2</sup> consist of at least 1/2 living greenery;
- Gardens with a surface area of 100m<sup>2</sup> or more consist of at least 2/3 living greenery.

§3. Gardens with a surface area of 300m<sup>2</sup> or more include at least 1 tree per garden.

Building code Kortrijk

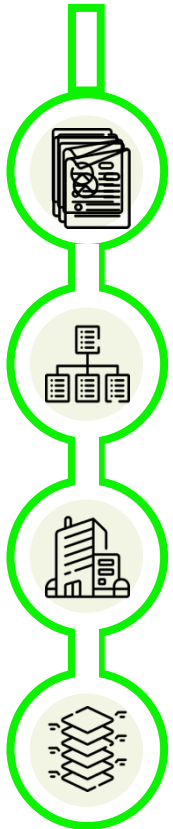


ACTS	Act	landscaping of gardens
	Action	Landscaping gardens
	Actor	Applicant for a permit
	Precondition	The garden should be considered as a space with a green character
	Postcondition	With this regulation, we impose quality requirements on the gardens and unpaved spaces in our city. After all, gardens are a spatial added value when living in Kortrijk, and the unpaved space plays a role in the climate-robust character of our city

FACTS	Label	Living green
	Text	Gardens include a minimal area of living greenery

DUTIES	Duty Holder	Applicant for a permit
	Duty	Gardens with a surface area of up to 50m <sup>2</sup> consist of at least 1/3 of living greenery
	Duty Holder	Applicant for a permit
	Duty	Gardens with a surface area between 50m <sup>2</sup> and 100m <sup>2</sup> consist of at least 1/2 living greenery
	Duty Holder	Applicant for a permit
	Duty	Gardens with a surface area of 100m <sup>2</sup> or more consist of at least 2/3 living greenery
	Duty Holder	Applicant for a permit
	Duty	Gardens with a surface area of 300m <sup>2</sup> or more include at least 1 tree per garden

This slide outlines the **cascading regulatory hierarchy** for the use case that we will show, organized into four distinct levels: Flemish, Provincial, Local, and Sub-local, each detailing specific legal requirements.



## FLEMISH REGULATIONS (14)

Decreet en uitvoeringsbesluit omgevingsvergunning, VCRO: codex ruimtelijke ordening, Vrijstellingsbesluit, Meldingsplichtige handelingen, Medewerking architect, Hemelwaterverordening, Natuurwetgeving, Gewestelijke stedenbouwkundige verordening inzake toegankelijkheid, Gewestelijke stedenbouwkundige verordening inzake breedband, Gewestelijke stedenbouwkundige verordening inzake openluchtrecreatieve verblijven, Algemene bouwverordening inzake wegen voor voetgangersverkeer, Gewestplan, RUP afbakening regionaalstedelijk gebied Kortrijk, Ruimtelijk uitvoeringsplan: Solitaire vakantiewoningen.

## PROVINCIAL REGULATIONS (1)

Provinciale stedenbouwkundige verordening inzake het overwelen van baangrachten.

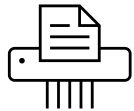
## LOCAL REGULATIONS - KORTRIJK (3)

Bouwcode Kortrijk, Gemeentelijke stedenbouwkundige verordening inzake financiële lasten bij omgevingsvergunningen, Gemeentelijke stedenbouwkundige verordening inzake sociaal wonen.

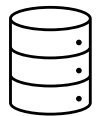
## SUB-LOCAL REGULATIONS (1)

Verkavelingsvereisten.

## Input



Permit application

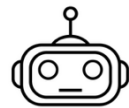


Digital twin of regulations – unambiguous, structured, deterministic

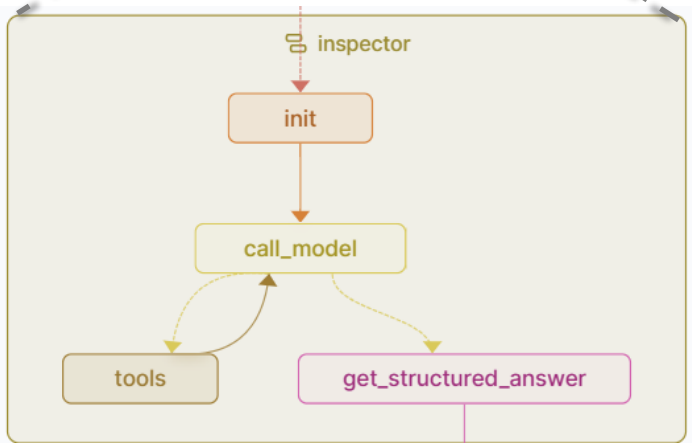
## AI Agents



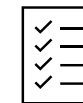
Supervisor Agent



Inspector Agent



## Output



Total compliance score with substantiation



# Digital Permit Application System

Streamlined permit applications for citizens and efficient review processes  
for civil servants



## Citizen Portal

Apply for permits with an intuitive step-by-step process

- Interactive map-based location selection with precise coordinates
- Dynamic questionnaires based on work type and regulatory source
- Upload site plans, photos, and material specifications
- Instant AI review feedback and compliance assessment

Enter Citizen Portal →



## Civil Servant Portal

AI-assisted application review with complete oversight

- Unified dashboard with real-time application statistics
- AI recommendations with confidence scores and compliance metrics
- Detailed application views with documents, materials, and answers
- Human validation workflow with approve/reject capabilities

Enter Civil Servant Portal →

## About This System

The Flemish Permit Portal is a comprehensive digital platform for the Belgium Flemish region. Citizens complete guided multi-step applications with location mapping, activity selection, document uploads, and context-aware questionnaires from regulatory sources. Civil servants access a unified dashboard with AI-powered recommendations, compliance scoring, and detailed application insights, while maintaining full human oversight for final decisions.

# The AI permit solutions is aligned with the functionalities formulated by the Flemish Government in 2025

The Flemish Government approved a concept note on ‘Actieprogramma inzake rechtszekere en robuuste vergunningen’. Within this concept note several requirements were formulated. Below you can see how the functionalities of our solution meet these requirements.

## Theme 1: Pre-Application Certainty



### SUPPORT & ACCESS

Enhanced **pre-consultation support** and digital access to environmental information.



### DIGITAL PORTAL

‘Smarter’ and more user friendly **Omgevingsloket 2.0** with an integrated digital helpdesk.



### CRITERIA CLARITY

Clear criteria for **admissibility** and **completeness** of applications.



### SIMPLIFIED NORMS

Simplified and clearer **norm books** for easier user navigation.

## Theme 2: Certainty during Application Process



### PROCEDURE EFFICIENCY

AI-driven **procedure efficiency** improvements for faster permit processing. Sufficient capacity, knowledge and means for qualitative decisions.



### FLEXIBILITY & MODULARITY

Allowing for a pause when requested, foreseeing time and means for **mediation**, introducing modularity.



### INFRASTRUCTURE & AUDITS

Investment in **ICT infrastructure** and internal monitoring audits. Increase of dossier fees at Flemish level.



### KNOWLEDGE EXCHANGE

Investment in **training and information sharing and exchange** between environmental civil servants and stakeholders.

## Theme 5: Robust Permits



### PERMIT CONSOLIDATION

Consolidating **overlapping permits** to reduce regulatory complexity.



### CUSTOM SOLUTIONS

Enabling **location-specific solutions** for rainwater management challenges (hemelwaterverordening).



### REGULATORY QUALITY

Ensuring good regulation leads to **legally certain** permits.



### ROBUST OUTCOMES

Achieving **robust permits** through streamlined and clear processes.

## Securing the buy-in among all stakeholder groups

### Ministers & Cabinets

- Kabinet Jo Brouns
- Kabinet Matthias Diependaele
- Kabinet Hilde Crevits

### Sector Organizations/ Industry Associations

- Embuild / Buildwise
- UPSI-BVS
- Real Serendipity ComV
- Netwerk Architecten Vlaanderen
- VOKA
- Orde van Architecten

### Local Authorities

- Stad Antwerpen
- Stad Mechelen
- Stad Gent
- Stad Kortrijk
- Stad Sint-Niklaas
- Stad Eeklo
- Stad Roeselare
- Stad Brugge
- Stad Genk
- Gemeente Edegem
- Gemeente Kalmthout
- VVSG

### Flemish Government

- Departement Omgeving
- Digitaal Vlaanderen
- Athumi
- VLAIO
- Agentschap Wegen en Verkeer
- Departement MOW

### Norm Engineering

- BelInformed

### Federal Government

- FOD BOSA

## To conclude – It's not the technology, it's the impact



### Policy Experts

**Language Paradox:** “If I don’t write in legal language, then I’m not protected. But when it’s in legal language, people don’t understand it.”

Reengineering makes it easier for policy experts to help constituents **understand policies** while maintaining legal protection. This process preserves the legal language as the authoritative source and provides **plain text** versions based on ‘Acts’, ‘Facts’, and ‘Duties’<sup>1</sup>. Displaying these texts side by side makes it easier for businesses and citizens to grasp the regulations, building **clarity and legal protection**.



### Businesses

**Administrative Challenge:** “I just want to run my business, but regulations can be confusing.”

Reengineering **consolidates** all relevant regulations—‘Acts’—and presents them as requirements—‘Facts’—and their associated compliance obligations—‘Duties’. This approach **simplifies the process of navigating the regulatory landscape**, allowing business owners to focus on their **core activities** and make **well-informed** business decisions.



### Citizens

**Access Challenge:** “I don’t know how to access government services. Where do I start?”

Reengineering creates **plain language** versions of regulations targeted to specific citizen services—‘Acts’. The various regulations—‘Facts’—are collated across multiple departments and government services to create a **single, seamless interaction** for citizens to **access vital services**. This approach aims to streamline processes, improve efficiency, and potentially enhance **citizen satisfaction** and **trust in public services**.

<sup>1</sup> Acts, Facts, and Duties follow the FLINT action-oriented interpretation method: (1) ‘Acts’ represent relevant regulations or actions performed, (2) ‘Facts’ are the requirements or conditions that must be met, and (3) ‘Duties’ are the associated compliance obligations that arise from the ‘Acts’ and ‘Facts’. To learn more, visit this research paper on semantic role labelling: <https://aclanthology.org/2022.lrec-1.47.pdf>

**Thank you for your attention!**



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