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ONTARIO UNDERGROUND INFRASTRUCTURE MAPPING STRATEGY EXECUTIVE SUMMARY

Ontario One Call is now operating as Ontario Dig Authority (effective October 1, 2026). This is a legacy document and therefore may contain Ontario One Call branding and references.

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Vision & Opportunity

Ontario's underground infrastructure is owned and managed by over 800 distinct underground infrastructure owners (UIOs), each storing asset data in different systems and data formats. As the authority responsible for coordinating locate requests and promoting safe digging, Ontario One Call faces growing challenges in relying on fragmented and inconsistent data to fulfil its public safety mandate. This fragmentation creates inefficiencies, increases safety risks, and leads to costly delays in excavation and infrastructure delivery.

The Ontario Underground Infrastructure Mapping Strategy (OUIMS) sets out a bold and actionable vision to address this fragmentation and transform how underground infrastructure data is managed and shared. Led by Ontario One Call and Infrastructure Ontario, the strategy aims to build a unified, secure, and standards-based data ecosystem that supports safe excavation, efficient planning, and resilient infrastructure delivery across the province.

By establishing a centralised underground infrastructure data register, adopting common standards, and implementing a harmonised data model, OUIMS will make underground asset data more accurate, accessible, and interoperable. Ontario One Call and Infrastructure Ontario envision a future where this improved underground asset data transforms how infrastructure is planned, delivered, managed, and protected in the province.

This transformation is projected to unlock CAD \$1.3 billion in economic benefits over ten years, with annual savings of over CAD \$161 million driven by reduced utility strikes, streamlined data acquisition, and improved excavation efficiency. In an optimistic scenario, annual savings could reach as high as CAD \$276 million, reflecting broader adoption, richer data, and advanced stakeholder coordination. Implementation costs are modest in comparison, with capital costs estimated to be between CAD \$24-38 million and total operating costs in an assumed operating period from 2030 to 2039 estimated to be between CAD \$4-7 million. These figures represent a strong value-for-money proposition, with benefits outweighing costs by nearly 30 to 1. A blended funding model, combining public investment with stakeholder contributions, is recommended to ensure sustainability and equity.

While the capital and operating costs of the platform are modest relative to its projected benefits, UIOs may individually face additional expenses related to data transformation and onboarding, particularly those with legacy systems or limited digital capacity. As these transformation efforts are essential to achieving the interoperability and data quality required for long-term success, a province-wide digital maturity assessment will be conducted as part of the strategy to determine the potential scale of these expenses. To support UIO onboarding, OUIMS proposes a phased rollout supported by tools, documentation, and training. While government may choose in future to provide financial support for data transformation efforts, this report does not assume nor explore that possibility.

It is of note that the figures above do not account for the significant additional value that could be realised through enhanced infrastructure planning, where digital twin capabilities, predictive analytics, and improved capital coordination could unlock extensive long-term economic benefits. Given the size of Ontario's infrastructure renewal budgets, OUIMS has the potential to deliver transformative economic and operational impacts across the province. Comparable international initiatives reinforce this potential, such as the United Kingdom's National Underground Asset Register (NUAR), which is projected to deliver £30 in benefits for every £1 invested, equating to £3.4 billion over a decade.

Realising this vision will require a fundamental shift in the way stakeholders collaborate, guided by shared principles of openness, data sharing, adaptability, and public safety. With a clear roadmap,



strong stakeholder support, and a compelling economic case, Ontario is uniquely positioned to lead this transformation. By embracing OUIIMS, the province can improve safety and efficiency in the near term, but also enable smarter, more resilient infrastructure delivery for decades to come. In doing so, Ontario can position itself as a North American leader in infrastructure delivery and management, setting a new benchmark for digital innovation, coordination, and public value.

Recommended Solution

To address the fragmentation of underground infrastructure data across the province, it is essential that Ontario establish a unified, authoritative source of accurate asset information. The solution recommended in this report is to create a modern, integrated mapping platform that harmonises underground infrastructure data and enables secure, standards-based data sharing across the province.

This approach builds on successful models from other jurisdictions. As mentioned, the UK's National Underground Asset Register (NUAR) has demonstrated how a centralised asset register can unlock significant economic value while delivering substantial public safety and excavation efficiency benefits. Likewise, the Netherlands' KLIC system, a mandatory national asset register, has supported safe excavation and efficient infrastructure delivery nationwide for decades. In North America, New York City's 811 system offers a state-wide digital mapping and notification platform that has improved coordination, reduced utility strikes, and accelerated project delivery by providing a single point of access to underground asset information.

By building on these proven models, Ontario can realise the safety, efficiency, and economic benefits of a harmonised underground asset register. The platform will support safer, more efficient delivery, renewal, and replacement of infrastructure while positioning the province as a leader in digital infrastructure management.

The recommended solution is structured around four core components that together enable secure, scalable, and standardised underground infrastructure data sharing across Ontario:

1. Data Submission Portal

A central interface for UIOs, supporting both periodic file uploads and direct Application Programming Interface (API) integration for efficient data sharing.

2. Ingestion & Standardisation Engine

A suite of tools and processes to convert shared data into a common data structure based on Canadian and international benchmarks, ensuring interoperability and clarity across all records.

3. Unified Mapping Platform

A robust, scalable system that brings together data from infrastructure owners into a single, authoritative source. The platform will be built on open standards and open-source technologies, with governance and cybersecurity as top considerations to ensure consistency, protection, and long-term sustainability. As the foundation of Ontario's future underground data ecosystem, it will be designed for flexibility and future growth, and support seamless integration and sector-wide adoption.



4. Secure Data Access Portal

The platform will include a secure portal through which users can access underground infrastructure data, with access tailored to user type. Initially, Ontario One Call will use the portal to support locate coordination, with the future potential to expand authorized access to other users through outbound APIs and role-based permissions. Robust cybersecurity protocols, including encryption and access controls, will ensure data protection and enable trusted collaboration.

Illustrated in Figure 1-1 below, the recommended solution is envisioned to support a staged expansion of user access as the platform matures and its capabilities grow. Initial access would be limited to Ontario One Call to support existing locate coordination processes, with future stages extending access to other user groups to support broader infrastructure planning goals.

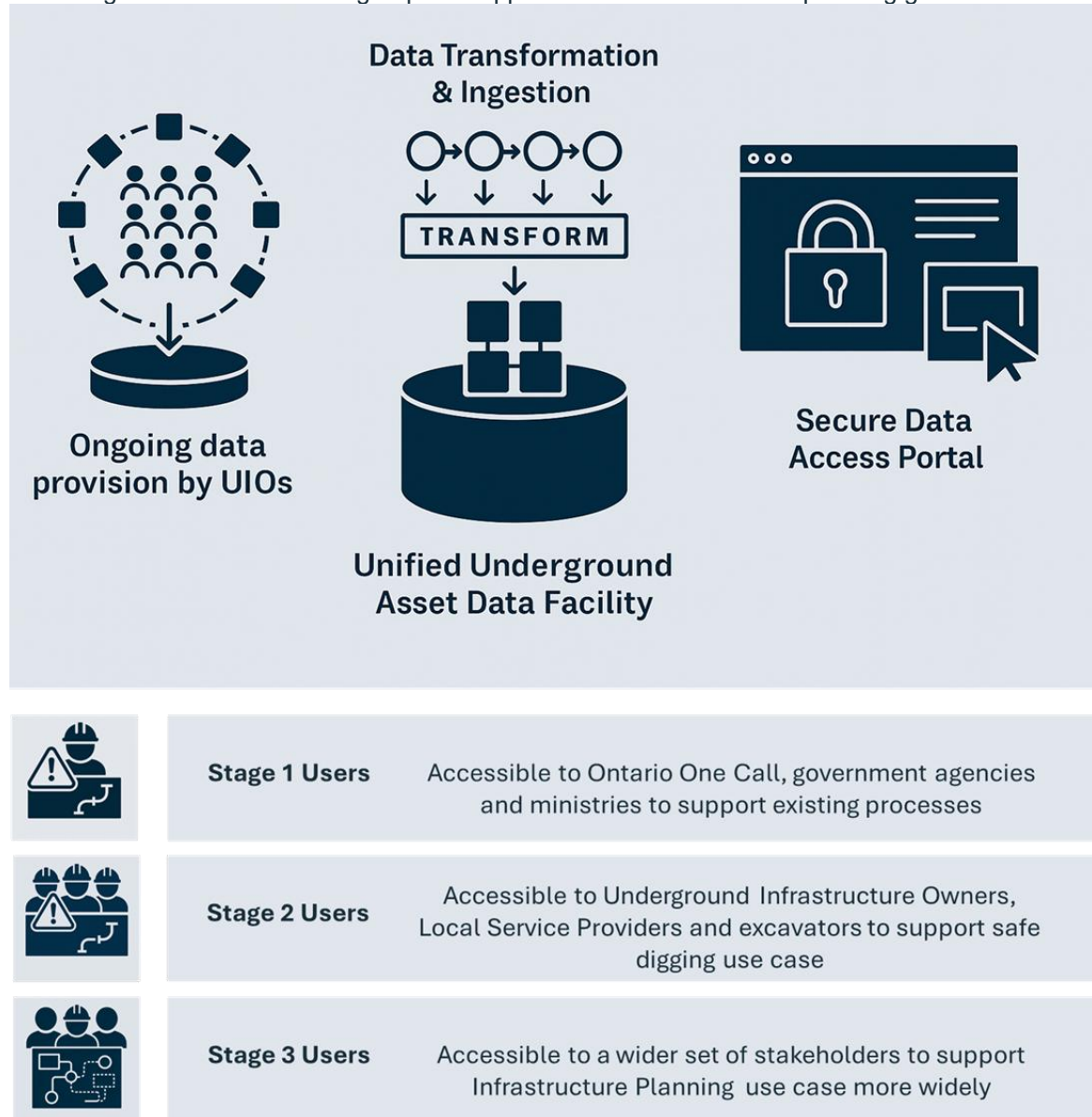


Figure 1-1 - Illustration of recommended solution

Benefits

The creation of a platform to share underground asset data will transform infrastructure management across Ontario. By unifying enhanced mapping data and enabling secure, role-based data sharing, OUIMS will unlock significant improvements in safety, efficiency, and innovation. This transformation will realise both shorter-term benefits, such as reduced infrastructure strikes, faster locate coordination, and improved excavation workflows, and longer-term benefits as the platform matures to enable richer data sharing, predictive analytics, and integrated infrastructure planning.

By drawing on global experience and established standards, Ontario's data sharing solution will drive sector-wide collaboration, standardisation, and improved outcomes - reducing costs, errors, and delays for infrastructure projects across the province.



Safer Excavation and Reduced Risk

At the heart of this transformation is a commitment to improved excavation safety. With better access to accurate, standardised data, the risk of utility strikes will be significantly reduced, protecting both workers and the public. Enhanced planning tools will support more precise and confident excavation activities.



Significant Economic Impact

OUIMS is projected to deliver over CAD \$161 million in annual savings, and CAD \$1.3 billion over a decade, through streamlined data sharing, reduced duplication, and faster, more reliable excavation workflows. These savings will benefit UIOs, excavators, municipalities, and the broader public by reducing delays, rework, and administrative burden. While these amounts do not include the potential for additional savings realised through enhanced infrastructure planning, international examples suggest even greater returns are possible. The UK's NUAR, for example, is expected to deliver £3.4 billion in economic benefits over a decade.



Efficient Infrastructure Planning

The strategy also lays the foundation for enhanced infrastructure planning. With richer data and predictive capabilities, users would be empowered to manage and deliver infrastructure more effectively across its lifecycle. This would reduce delays, optimise investment decisions, and improve coordination across capital programs. Given that Ontario's public infrastructure has a replacement value in the hundreds of billions of dollars, with annual renewal budgets in the tens of billions of dollars, OUIMS has the potential to unlock further substantial long-term value.



Global Validation and Proven Models

A jurisdictional review of 21 international systems, including those in the UK, Netherlands, Belgium, Singapore, South Korea, demonstrates consistent benefits from modernising underground infrastructure data sharing. These include:

- **Safety:** Reduction in infrastructure strikes and excavation-related damages and incidents.
- **Efficiency:** Faster project delivery and reduced locate delays.
- **Planning:** Enhanced infrastructure coordination and lifecycle asset management.
- **Innovation:** Integration with future digital twins, AI analytics, and permitting systems.

Global success stories reinforce the transformative potential and benefits of OUIIMS. Around the world, modernising the way in which underground infrastructure data is managed and shared has led to measurable economic benefits and improvements in safety, efficiency, and planning. As mentioned, the UK's NUAR is on track to deliver £3.4 billion in benefits over a decade – an impressive return of £30 in benefits for every £1 invested – through the provision of instant, secure access to data from hundreds of infrastructure owners. Meanwhile, Singapore's 3D underground mapping initiative is enabling smarter land use and infrastructure development through advanced modelling, and South Korea has made significant strides in integrating underground infrastructure data as part of its broader smart city and safety initiatives.

These brief examples highlight only a fraction of the potential that could be unlocked by enhanced infrastructure data and a unified, standards-based approach. Ontario is well-positioned to build upon this global momentum to deliver a high-impact, made-in-Ontario solution that leads to safer operations, better-informed decisions, and more resilient communities.

Ontario One Call's Unique Position

Ontario One Call (OOC) enters this initiative with a distinct advantage: it is not starting from scratch, but instead is building on a foundation of existing relationships, regulatory authority, and operational experience. With a legislative framework already in place and trusted relationships with all UIOs, OOC is uniquely positioned to accelerate delivery where others have had to build from the ground up. By enhancing existing architecture and systems and front-loading the core data platform, OOC is poised to reach operational readiness in just four years.

“Ontario One Call is not building from scratch – it's building on strength.”

Several factors contribute to Ontario One Call's readiness for implementation:

- **Established UIO Relationships:** OOC has well-established connections with all underground infrastructure owners across the province.
- **Legislative Authority:** As a regulator, OOC has the legislative authority to compel UIOs to provide underground infrastructure data.
- **Routine Data Sharing:** UIOs are already accustomed to submitting data, and engagement shows they value OOC's role in safe digging practices.
- **Standards-Based Data Model:** A draft data model has already been developed as part of this report, built on the internationally recognised Model for Underground Data Definition and Integration (MUDDI) framework and aligned with local standards.



- **Platform Enhancement, Not Reinvention:** Unlike other platform examples such as NUAR, the OUIMS solution builds on existing architecture and systems, making implementation more straightforward.
- **Operational Head Start:** OOC currently runs a successful locate-support operation, and by prioritising the development of the core data platform, benefits from shared data can be realised early, even as new web applications are developed.
- **Realistic Planning:** All estimates and assumptions are cautious and grounded in experience, supporting a confident path to a fully operational platform in 2030.

Taken together, these factors give OOC a credible and practical foundation for leading the implementation of OUIMS. Its existing mandate, relationships, and operational infrastructure reduce barriers to delivery and create a favourable environment for early success. This readiness is matched by strong support from stakeholders across the sector.

Stakeholder support and advocacy

Stakeholder engagement revealed strong and consistent support for the development of a standardised underground infrastructure mapping solution. Across workshops, interviews, and surveys, participants highlighted the need for a centralized data ecosystem and welcomed the proposed initiative as both timely and transformative.

While stakeholder priorities varied across groups, including excavators, locate service providers (LSPs), municipalities, and UIOs, there was broad consensus on the need for a balanced, sector-wide solution that serves the public good. Key themes of advocacy included:

- **Safety and Efficiency Gains:** Stakeholders, particularly UIOs, municipalities, and LSPs, emphasised the potential for reduced utility strikes and faster project delivery through harmonised data sharing.
- **Sector-Wide Collaboration:** There was broad consensus on the value of a shared platform governed by common standards. Many participants noted that the initiative would foster greater trust and cooperation across the sector.
- **Digital Transformation Readiness:** Numerous UIOs indicated readiness to participate in data transformation efforts, recognising the long-term benefits of interoperability and integration with other systems in the future.
- **Support for Governance Structures:** The proposed creation of a Data Model Governance Group and Champion Network were positively received, with several stakeholders volunteering to contribute to these forums to ensure sustained momentum and sector-wide adoption.
- **Momentum for Legislative Reform:** Stakeholders acknowledged the importance of legislative clarity and expressed willingness to support interim data sharing agreements to accelerate implementation.

This groundswell of support reinforces the strategic direction of OUIMS and provides a strong foundation for continued collaboration, funding mobilisation, and phased rollout.



Roadmap

The roadmap below defines a five-year programme to deliver an underground utility data sharing facility, moving from strategic planning to full provincial rollout and steady state operations. It adopts an agile “One Team” approach, supported by strong governance and continuous stakeholder engagement.

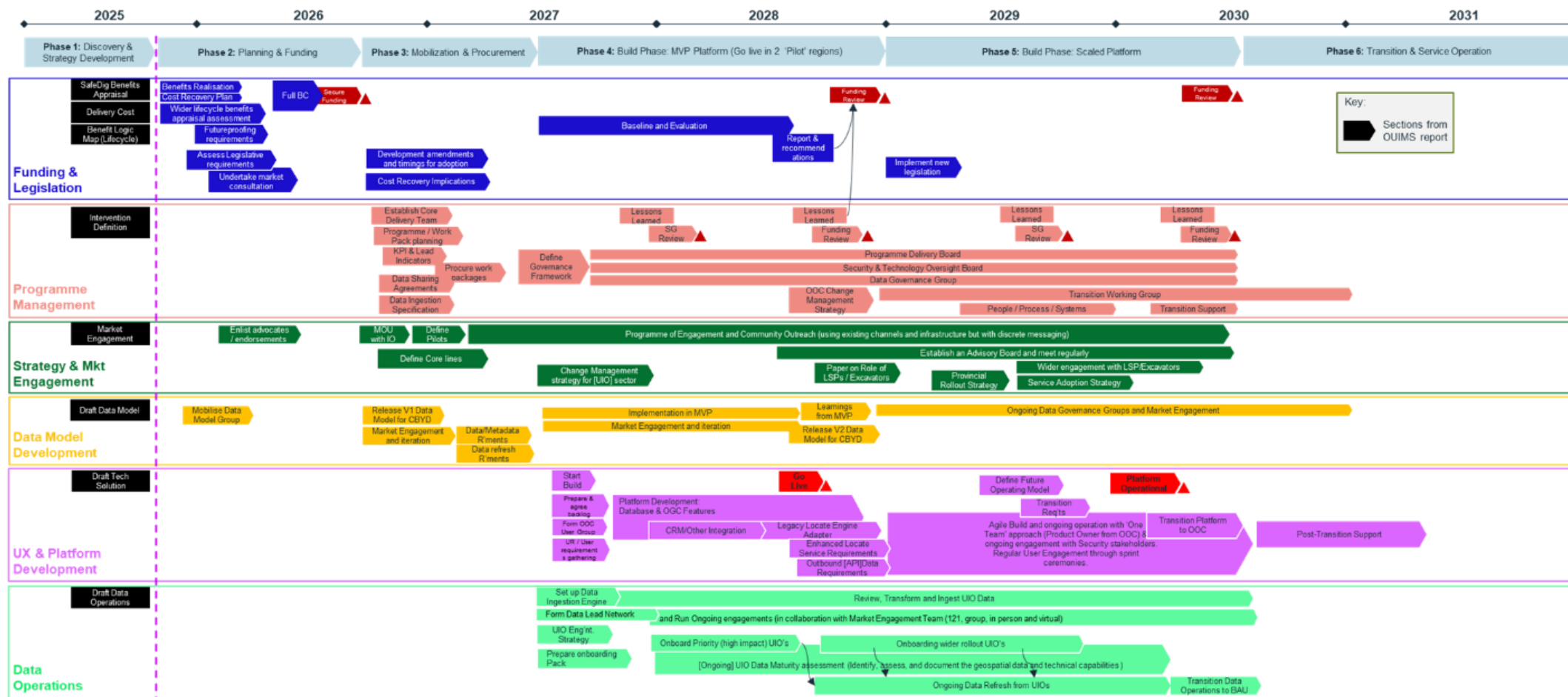


Figure 1-2 - Implementation Roadmap



Implementation Phases

The following are the key components of the roadmap in each phase:

Phase 1 – Discovery and Strategy (4 months) *[Completed]*

- Establish strategic foundations and engage industry stakeholders.
- Develop an early data model in line with MUDDI and local standards.
- Deliver the OUIIMS final report, concluding Phase 1.

Phase 2 – Planning & Funding (9 - 12 months)

- Produce a business case to secure funding for implementation.
- Establish governance structure and project management tools and processes.
- Consider key partnerships and outreach.
- Initiate early implementation planning and stakeholder coordination.
- Convene data experts in early conversations to support data model development.
- Consider early launch of UIO digital maturity assessment.

Phase 3 –Mobilisation and Procurement (9 - 12 months)

- Mobilise the core project team within Ontario One Call.
- Run procurement processes, as necessary.
- Evaluate the cost-benefit analysis to determine its applicability to broader use cases.
- Define detailed scope, technical requirements, and work packages.
- Identify pilot regions for early Minimum Viable Product (MVP) rollout.
- Publish draft data model and engage the data community.
- Conduct UIO digital maturity assessment (if not already started).

Phase 4: Build Phase: Minimum Viable Product (18 months)

- Develop the MVP platform and supporting tools.
- Deploy the MVP in at least two pilot regions to test and showcase functionality.
- Onboard select UIOs (e.g., gas, electricity) for the pilot regions to enable early evidence of progress.
- Undertake a review of progress and develop lessons learned as part of a report back to government to secure next-phase funding and alignment.

Phase 5: Scaled Platform and Rollout (18 months)

- Enhance platform capabilities, scale infrastructure, and release updated data model.
- Execute provincial rollout and extend access to additional user groups.
- Address legislative requirements and cost recovery mechanisms.
- Work with partners to align with a potential Digital Twin Conceptual Data Model.
- Refine platform capability and scale infrastructure to cater for provincial-wide rollout.
- Continue onboarding UIOs implement ongoing data refresh cycles.

Phase 6: Transition to Service Operation

- Transition the platform and operations to business-as-usual under Ontario One Call.
- Platform will be operational, with benefits beginning to accrue by 2030.
- Embed governance, support, and performance tracking into steady-state operations.

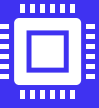
This phased approach ensures controlled delivery, measurable benefits, and sustainable operations, balancing urgency with assurance for all stakeholders, while enabling OOC to concurrently operate a locate notification system to fulfill its mandate.



Key Enablers

Successful implementation of OUIIMS will require a coordinated set of foundational enablers that support delivery, adoption, and long-term sustainability. These enablers span, data, technology, governance, funding, and capability-building, and reflect lessons learned from international best practices and Ontario's own infrastructure context. Together they form the critical conditions for success, ensuring the platform is built, but also trusted, used, and continuously improved.

Table 1-1 Key Enablers of OUIIMS

 Unified Data Register	Build a unified, scalable, and authoritative register for underground infrastructure data in Ontario. • Supports Ontario One Call's mandate to operate a locate notification system and promote safe digging, and is consistent with its evolving role as a Public Safety Administrative Authority. • Enables access for authorised entities for excavation and infrastructure planning purposes in the future.
 Harmonised & Extensible Data Model	Develop and implement a harmonised and extensible data model based on CSA S250 and OGC's MUDDI Standard. • Enables interoperability and consistent data quality across stakeholders. • Supports diverse asset types and future use cases (e.g., predictive maintenance, digital twins).
 Modern, Modular Technology Platform	Develop an appropriately architected, modern technology stack, with a platform built on a core foundation of open-source components. • Build a modern, multi-layered basemap that is robust and scalable, and that supports all technical requirements. • Implement scalable ingestion, transformation, and visualisation services. • Design for interoperability, user-centric development, and future integration with analytics and other relevant systems.
 Enhanced Data Operations	Establish robust data operations to support the onboarding, transformation, and ongoing refresh of underground infrastructure data. • Onboard UIOs in phases through structured data transformation workflows aligned with the common data model. • Maintain data quality through regular refresh cycles and metadata management. • Enable secure data submission via drag-and-drop and API enabled ingestion portals with automated validation.
 Security & Resilience	Establish robust security and technology oversight to protect sensitive infrastructure data and ensure platform resilience. • Establish a Security & Technology Oversight group comprised of industry and security experts to advise on platform cybersecurity, penetration testing, and data sensitivity protocols • Assess security and operations functions to enable detection of threats, respond to alerts, and increase cybersecurity awareness.



 Legislative Reform	Amend OUINSA to mandate accurate, standardised data sharing and timely updates. • Define clear requirements for data accuracy, formats, update frequency, and liability. • Enable cost recovery and sustainable funding mechanisms. • Establish agreements and long-term legal structures for data sharing in alignment with legislative reform efforts.
 Sustainable Funding Model	Adopt a blended funding model with public sector investment and mandated stakeholder contributions. • Fund the initial capital build of the platform through public investment, and sustain long-term operations through stakeholder contributions, in alignment with international best practice (e.g., NUAR in the UK) • Evaluate applicability of OUIIMS to other use cases to realise further economic benefits.
 Geospatial Capability Building	Support UIOs with platform onboarding and data transformation enablement, and assess OOC's long-term GIS capacity. • Undertake a digital maturity assessment of UIOs to assess readiness, and design strategies to support varying capability levels. • Consider providing centralised data transformation services for UIOs to accelerate platform onboarding, reduce burden on UIOs, and support adoption across the sector. • Assess OOC's long-term GIS capacity to support platform operations and scaling for future operational needs.
 Community & Governance Networks	Establish governance groups, industry networks, and advisory councils to provide oversight and foster collaboration and continuous improvement across the sector. • Establish specialised groups, including a Data Model Governance Group and other potential advisory councils, to provide guidance on standards, security, and strategic direction. • Establish industry networks to promote adoption amongst UIOs and encourage engagement, learning, and the sharing of best practices.
 Stakeholder Engagement & Change Management	Drive adoption and manage change through targeted engagement, tailored support, and value alignment. • Engage extensively with UIOs, excavators, LSPs, and municipalities through a variety of methods and channels to build momentum and support. • Align platform features with structured value propositions and benefit logic frameworks and validate these with stakeholders. • Support UIO onboarding to the platform with outreach materials, training, and individualised guidance based on the province-wide digital maturity assessment.

In Summary: Unlocking Long-Term Value for Ontario

The Ontario Underground Infrastructure Mapping Strategy represents a transformative opportunity to modernise how underground infrastructure data is managed, shared, and used across the province. By establishing a unified, secure, and standards-based data registry, Ontario will unlock significant safety, efficiency, and economic benefits - reducing utility strikes, accelerating excavation, and enabling more efficient infrastructure planning.

OUIIMS is a proactive investment in Ontario's infrastructure future. The strategy reflects a growing consensus across stakeholders that fragmented data systems are no longer sustainable. Given that Ontario's public infrastructure has a replacement value in the hundreds of billions of dollars, with annual renewal budgets in the tens of billions of dollars, the province requires a modern, interoperable data ecosystem to support safe digging, coordinated capital delivery, and long-term asset resilience.

With strong stakeholder support, a clear implementation roadmap, and a compelling economic case, OUIIMS is well-positioned to deliver lasting value for Ontario's infrastructure ecosystem. The strategy builds on Ontario One Call's existing strengths and regulatory mandate, offering a realistic and scalable path to implementation. By pursuing this initiative, Ontario will not only enhance public safety and infrastructure resilience but also establish itself as a North American leader in infrastructure delivery and management, setting a new benchmark for innovation, coordination, and public value.



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