OAKVILLE

Property Development Digital Plan: A Digital Transformation Solution

Final Report
January 10, 2023

AECO innovation lab

in partnership with

Deloitte.

Contents and Project Deliverables

Creating a Digital Vision for the Property Development Service

The digital vision for Oakville's Property Development Service is the foundation for the Digital Plan and Roadmap – it is the anticipated end-state for 2030. This vision will affect numerous departments in the Town, including, but not limited to: Building Services, Planning, Transportation and Engineering, Municipal Enforcement, and Strategic Business Services.

In developing a digital vision for Oakville's Property Development Services, key principles informed the recommendations:

- Do not be constrained by the current processes, technologies, and other limitations – the Town is interested in new and emerging technologies in this space
- Incorporate the four pillars – people, process, technology, and data – into the vision, goals, and objectives
- Bring in the best practices and experiences of leaders in this space to inform the 'art of the possible' for the Town

Current State Assessment

Overview | Our Approach to Current State Analysis for Developing the Vision

~50
DOCUMENTS

Review of Key Documents shared by Town Staff

Conducted an in-depth review of key documents including:

- Plan-it Reports, Plans, Roadmaps, Presentations, and Status Updates
- Organizational Charts
- Documents and Presentations on Data, Data Strategy and Analytics
- Staff Opinion Surveys
- AMANDA Uses
- SWOT Analysis
- Process Information

+

13
STAKEHOLDER INTERVIEWS

Conducted one-on-one interviews with key staff throughout process (May - June 2022)

The AECO-Deloitte team conducted 1:1 interviews with commissioners, directors, and managers on the following topics:

- Digital Vision components (what is needed and what should be omitted)
- Current challenges with going digital – technology, data, people, and processes
- The role of Building Information Modelling (BIM) and GIS
- Roles and Responsibilities for the Digital Plan

***Service Lines**: Planning, Building, Municipal Enforcement, Transportation and Engineering, Asset Management, Strategic Business Services, Strategy, Policy & Communication, Information Technology Solutions, Service Oakville*

The current state analysis was developed through comprehensive qualitative and quantitative research. This analysis serves as a 'baseline' as we develop the future state operating model.

Current State Key **Focus Areas**

Current State **Deep Dives** of opportunities for integration in the Property Development Service Delivery Model

Overview | Who We Heard From

Name	Title
Jane Clohecy	Chief Administrative Officer
Phoebe Fu	Commissioner, Community Infrastructure
Neil Garbe	Commissioner, Community Development
Julie Clarke	Director, Strategy, Policy, & Communication
Ralph Kaminski	Director, Building Services
Jim Barry	Director, Municipal Enforcement
Gabe Charles	Director, Planning
Lina Marinova	Manager, Strategic Business Services
Jill Stephen	Director, Transportation and Engineering
Catharine Hewitson	Director, Asset Management
Sam Zurzolo	Director, Information Technology Solutions
Victor Paolo	Manager, Service Innovation
Frank Goehner	Supervisor, Business Solutions and Analytics

Deep Dive | People

KEY INSIGHTS

- Poorly defined **roles and responsibilities** make it difficult for staff to know where to go when they need information:
  - There is a **decentralized** approach to getting things done.
  - No one has the **authority** to get everyone on the same page.
- There is a clear and documented appetite for change at the senior management level but concerns as well:
  - How do we ensure that there is **staff buy-in**?
  - How do we ensure that staff are **adequately trained** on and **engaged** with these new technologies and processes?
- **Change management** will be an important factor in achieving this goal:
  - Must clearly identify where Oakville wants to go and how it wants to get there.
  - Clearly setting roles, responsibilities, and authority.

EXAMPLE

New technologies will require new skillsets and a new approach to human resources – hiring priorities will have to change to ensure that new employees are knowledgeable of new technology, and new training will have to be provide existing staff to ensure that they are kept up to date with the latest technological advancements.

"People need to know the inputs, outputs, and where we're going."

"Some will quickly adapt, others will not"

"There is a different level of tolerance for allowing technology to drive processes versus people driving those processes"

"People think they are unique and want to be independent – it is hard to influence them"

"People, process, and technology - in that order"

"Believing it can be done versus believing that Oakville can do it"

QUESTIONS FOR EXPLORATION

1. Who will have the responsibility of implementing the digital plan and roadmap?
2. What resources and support will staff need to adapt to the digital way of thinking?

Deep Dive | Process

KEY INSIGHTS

- Processes have **not been adapted** to suit the current way of doing work:
  - Digitization requires new processes.
- There is **no clear process** or requirements mapping done – either intradepartmental or interdepartmental:
  - Intake should capture all needs.
  - There are **inconsistencies between departments** in terms of communication and requirements.
- A **standardized approach** to submissions ensuring that what is being submitted to the Town follows a documented standard.
- There is an **overall lack of vision**.
- Concerns about applicant being introduced to and adapting to new processes.

EXAMPLE

The new online portal that was created has allowed for customers to more easily share documents – and works great from their perspective – however there are difficulties in standardizing what is being done behind the scene. What communication tools are used? How is the submitted content being checked? What standards can we use to simplifying the processing of submissions?

"We should rethink how to process drawings - paint a clear picture of future and start planning now"

"We need to coordinate all the different processes across the departments"

"Need to pin all our initiatives together through process changes and integrations to make things fast and easy"

"We're working backwards – we have thrown stuff online but haven't done the work of process engineering and figuring out where they go"

"We lack the foundation – everyone is just doing things. There is no standard, creating processes to digitize the current state is a waste of time"

QUESTIONS FOR EXPLORATION

1. How can the Town simply their property development service? What information is required at each step of the way to review submissions?
2. How can we create new processes to ensure that information and data collected can go to the relevant users?

Deep Dive | Technology

KEY INSIGHTS

- There is currently a **decentralized approach** to technology
  - Departments see a 'new shiny toy', decide they want it, and worry about fitting it in later.
  - **No one group oversees** the adoption of new technology.
  - With this approach, many of the technology investments that are being made are **not being used to their fullest potential**.
- The Town is **hesitantly excited** about new technology opportunities:
  - Many agreed that BIM and other technologies/tools would be useful and are likely to be used in the future.
  - The Town is not prepared – the **skillsets** are not there and would need to be developed.
- Outright replacing AMANDA would be a complex, lengthy, and costly endeavor – but technology can be put in front of it

EXAMPLE

The Town has adopted many technologies that provide better customer service and allow staff to do their jobs more easily. This includes an applicant portal for online Property Development submissions, Bluebeam to allow to review drawings, and ArcGIS Urban for planning purposes. This shows that the Town is open to change but is perhaps not sure of how to move forward.

We need to be taking advantage of digital technology in the future – we need to transition from paper to digital to BIM"

"We need to think about marrying the 3D with AR/VR long term – a quantum shift of what built environment is going to look like"

"With AMANDA, we're trying to make AMANDA fit our processes – but technology doesn't work that way"

"We need to use technology to enable business transformation"

"Technology changes so fast - we must have collective endorsement of the end state and flexible opportunities on how to get there

QUESTIONS FOR EXPLORATION

1. Where does the Town want to be when it comes to technology? What technology exists that is currently of interest to staff?
2. Will new technology integrate with existing technology or replace it?

Deep Dive | Data

KEY INSIGHTS

- Lack of **central structure and governance** in data :
  - No one knows what data exists, where it exists, who is responsible for it, etc.
  - There are **no clear standards** for how property development data is collected and stored.
- Would like to see a '**Single Source of Truth**' – one dataset to rule them all – that is automatically updated and accessible:
  - Uncertain about whose mandate this will fall under.
  - Need clear roles and responsibilities for data.
- There were difficulties in obtaining data from AMANDA as it is not set up in a way that allows for easy access.
- Some hesitancy to acquire and use data as it may show undesirable results despite other areas improving.

EXAMPLE

Address information can be found in four different formats – no one person has ownership over the complete data set which has resulted in many ways of recording the data and no way to consolidate the data into a single useable list without significant effort.

"There is a desire to jump in on data side – we tried it in past but failed because we got overwhelmed"

"We need standardized data"

"A basic problem is data literacy. If we are able to build data literacy or a way to get there it would be huge success "

"There is no concept of 'single source of truth' in Town. Where is the best data?"

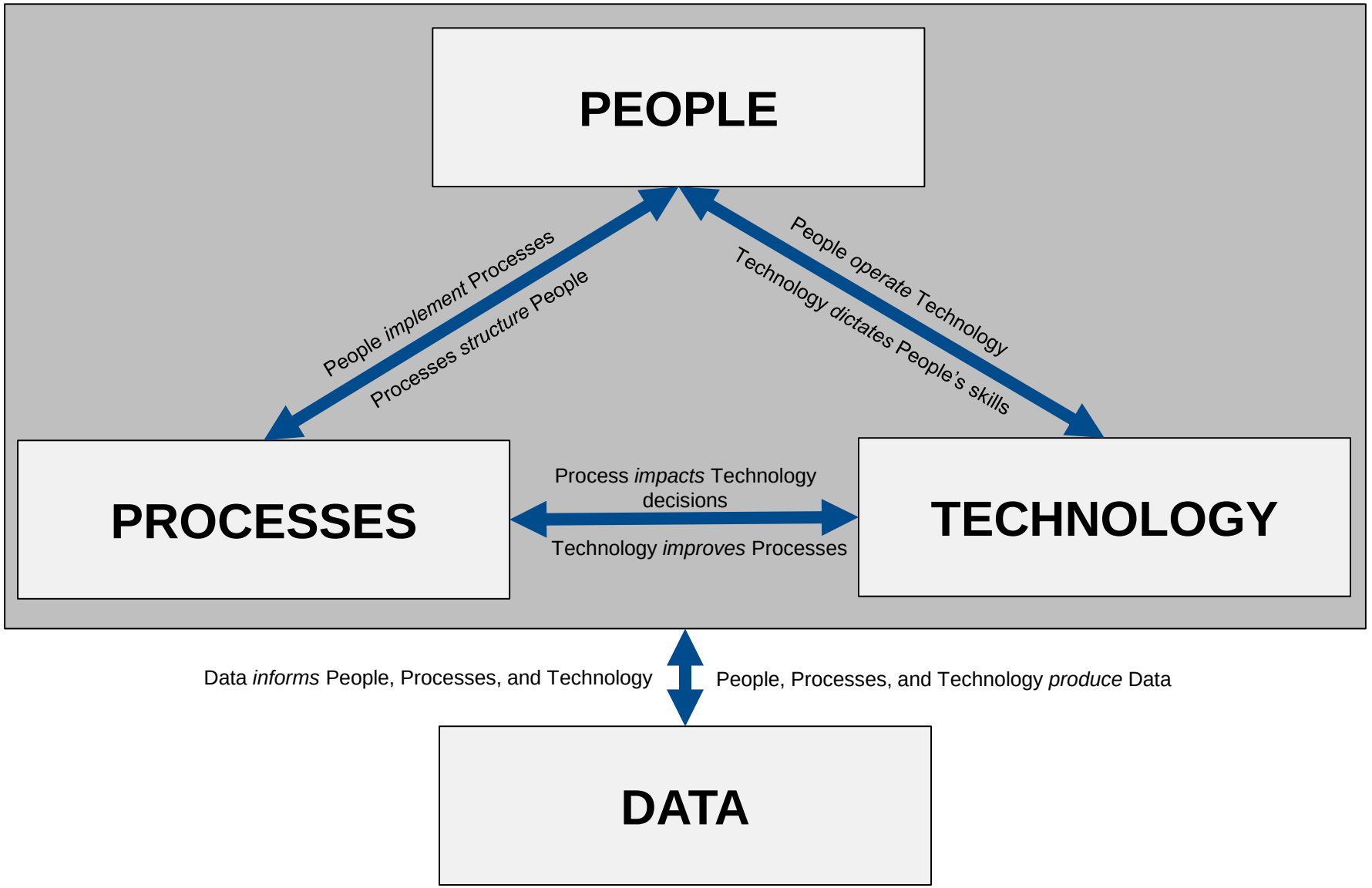
"With data, we need roles, responsibility, and accountability - but sometimes others get involved and try to take charge"

QUESTIONS FOR EXPLORATION

1. What is the relevant information that pertains to Property Development? How is it used?
2. Who should own the various data sets?

Oakville’s Digital Vision for Property Development

Key Components of Oakville's Digital Vision: The Four Pillars



Key Components of Oakville's Digital Vision: People and Processes

PEOPLE

- **Governance** - Clear structure to guide digital transformation and push groups where necessary to ensure adoption across the property development departments.
- **Staff Needs** - Clear requirements on what staff need to adequately perform their role in a digital environment and ensure that the digital transformation can be enacted.
- **Customers** - Clear requirements for applicants and other external stakeholders on what digital means in the context of Oakville's property development services.

PROCESSES

- **Digitization to Automation** - Automation in select areas to do routine tasks and communications to allow staff to have more time to tasks that require more expertise and subjective decision making.
- **Being Digital vs. Doing Digital** - Clear and efficient processes that make use of digital tools instead of simply digitizing existing inefficient processes.
- **Collaboration and Integration** - Streamlining process and automating exchanges between internal departments and with external stakeholders to minimize miscommunications and encourage transparency.
- **Procurement** - Procuring new digital tools and technologies must be coordinated, streamlined, and responsive enough to meet the needs of the Town.

Key Components of Oakville's Digital Vision: Technology and Data

TECHNOLOGY

- **Modern Technology** - Adoption and use of modern technologies and tools to more quickly review applications, communicate more efficiently, and unlock new opportunities.
- **Flexibility** - Adoption of modular way of thinking to prevent being tied to a single solution for long periods of time to allow the Town to be able to adapt to different offerings that best suit the Town's needs.
- **Scalability** - A solid foundation that allows for the Town to identify new digital opportunities and adequately scale to expand capabilities when faced with new innovations.

DATA

- **Governance** - Clear roles and responsibilities around data used in the property development space to ensure that data sets are consistent across all departments.
- **Single Source of Truth** - A single location where all data can be entered and retrieved in a standardized format for us for analysis and review of property development applications.
- **Standards** - Consistent intakes and communications of data and information to minimize inefficiencies.

Town of Oakville Vision for Property Development Service

Implement a **modern and fully integrated** property development service platform that supports Oakville's vision to be one of the **most digitally connected and livable** communities in Canada by **2030**.

Town of Oakville Vision for Property Development Service

Collaborative and Generative City Planning that maximizes the use and value of Oakville's land and benefits to its communities.

Modelling Town Assets to ensure newly built infrastructure is digitally captured and managed.

Emergency Planning to analyze the impacts and need for emergency services in new developments.

Digitized Infrastructure to aid in analyzing development applications and capture new infrastructure.

A Town Hall that will have a better understanding of and more information regarding new developments for council and residents to discuss.

Environmental Simulations to ensure Oakville's growth is sustainable and resilient.

Smart City Applications to create more integrated, data-centric communities.

Transit Planning to review the need for new transit options in areas of new development.

Modelling of Parks and Greenspace to analysis the impact development has on parks and canopies.

City Departments that can make faster, more informed decisions on development applications through the use of GIS and BIM to make Oakville the most livable Town in Canada.

Achieving the Vision

Oakville's Digital Vision

Vision Statement: Implement a modern and fully integrated property development service platform that supports Oakville's vision to be one of the most digitally connected and livable communities in Canada by 2030.

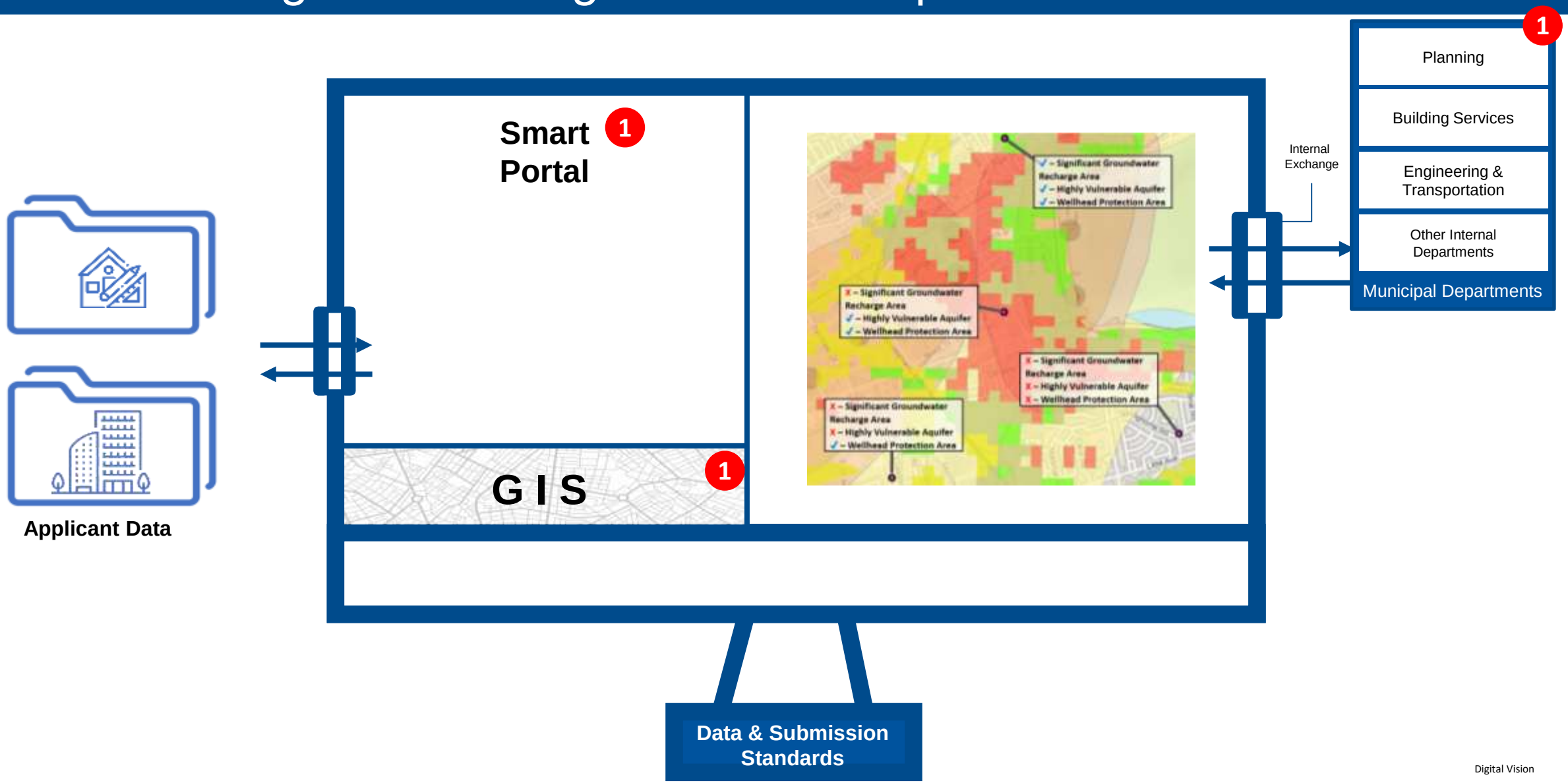
Developing a modern property development service platform and becoming digitally connected in this space implies the use City Information Modelling (CIM) in the review and analysis of property development applications. In involves creating a virtual equivalent of the Town – a *digital twin* – that can support staff in providing key insights, data, simulation, and 'what-if' scenario planning for development approvals.

To achieve the vision and successfully incorporate CIM into day-to-day use in the property development process, Oakville will have to adopt many existing and up-and-coming processes and technologies. Fortunately, Oakville will not be alone in this endeavor, many other jurisdictions have been on this path for over a decade.

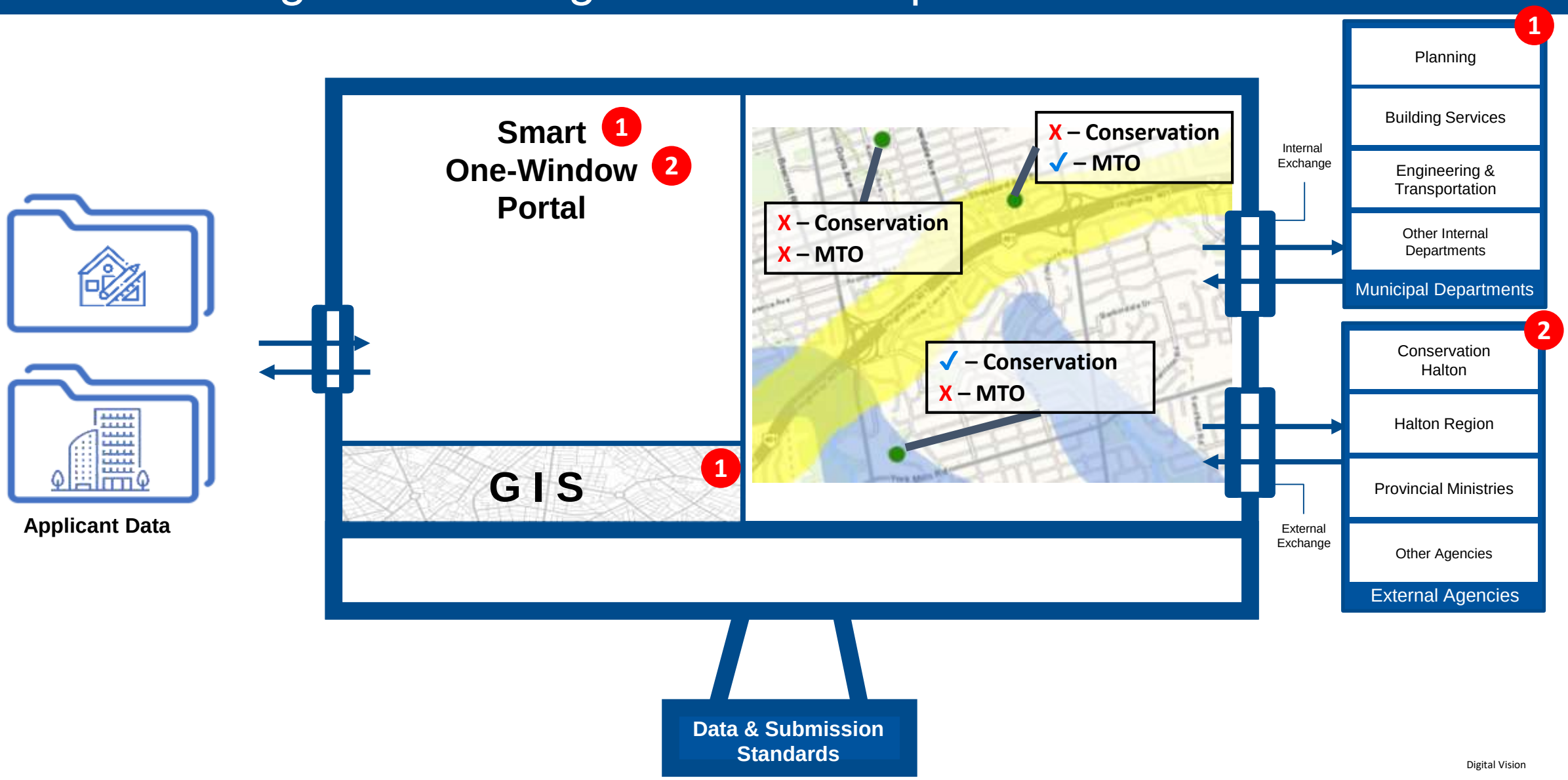
Key elements must be introduced or enhanced to accommodate:

- **Geographic Information Systems (GIS)**
- **Building Information Modelling (BIM)**
- **Automation within the processing of property development applications**
- **Integration of data – namely GIS and BIM – but also other sources**

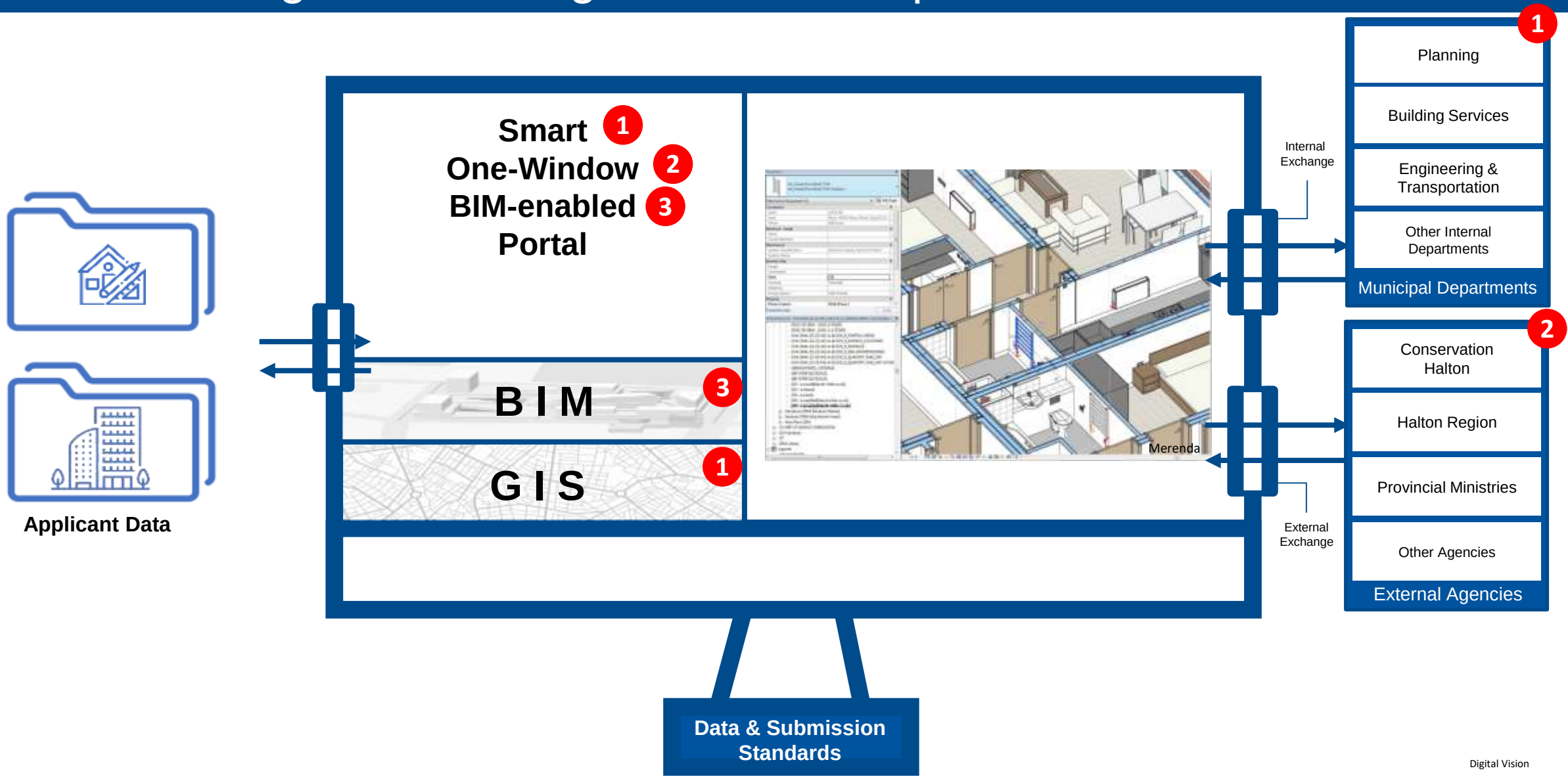
Achieving Oakville's Digital Vision – Step 1



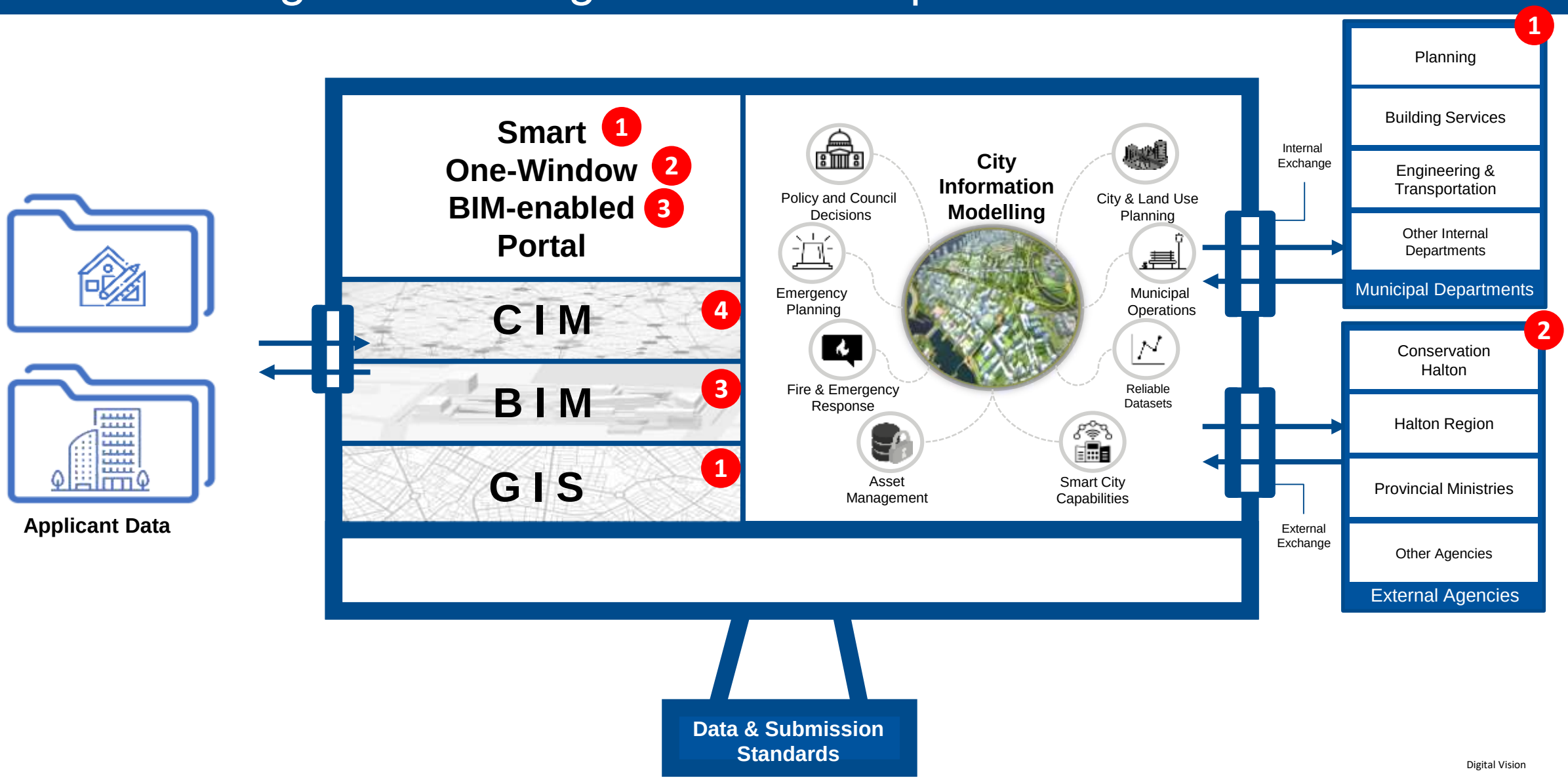
Achieving Oakville's Digital Vision – Step 2



Achieving Oakville's Digital Vision – Step 3



Achieving Oakville's Digital Vision – Step 4



Digital Ambition Statements

Vision – Deep Dive

What forces are shaping the future?

- What opportunities does digital, data, and analytics create for us to explore new operating models?
- What forces threaten to change our business environment — and how can we respond?
- What is changing the value of a customer for our business?
- How are our ambitions changing and how do they need to change?

What are your ambitions for the future and what business ideas are needed to create incremental or exponential value?

- How might we create new value sources from customer assets and create a better return on relationship?
- How can we build a customer and partner ecosystem that amplifies the creation of business value?
- How can we use big data and customer insights to improve experiences across digital devices?
- How might our people be better enabled and aligned to succeed?

How must we prioritize opportunities to transform?

- Do we have the right portfolio of products, services, experiences, relationships, capabilities to compete in the future?
- How do we align our core capabilities across the organization to support our digital goals?
- What operational transformations should we initiate in order to begin capturing and learning from the business environment around us?

Vision – Deep Dive

We will invest in differentiated technology assets to elevate the customer experience and streamline internal processes.

To win, our customers want access to streamlined processes, increased transparency, new technology, and improved engagement. Town of Oakville will meet this through improved collaboration, process automation and workflow tracking, team skills development, and a refined application submission requirements.

Technology assets are a critical component of our long-term growth and will power new insights and value for our offerings by:

- **Increasing our application evaluation rate**
- **Accelerating time-to-value**
- **Creating centralized access to project and site data**
- **Incrementally expanding our existing services**
- **Creating a new national benchmark for the development approval process**

Guiding principles

These Guiding Principles set the tone for the digital plan, and act as a set of values for tangible delivery of the transformation program while promoting collaboration and maximizing impact.

Focus on Value Prioritize use-cases with the most value to deliver tangible impact while aligning to internal capacity to manage the change	**Accelerate Execution** Consider the relative digital maturity of current state processes and supporting technology to leverage existing infrastructure where possible, pursue quick wins,
Agile Approach Roll-out use cases across multiple releases to incorporate lessons learned and re-prioritize backlog, as needed	**Minimal Disruption** Build with minimal disruptions to Oakville's core operations

Town of Oakville Vision Statement for Property Development Service

In order to do things better, the Town of Oakville targets a better customer experience and digital enablement to allow their staff to provide an enhanced experience and ease of doing business.

The Digital Plan will…
(3 Goals)

- Develop or adopt standards for application submissions to streamline integrations and facilitate data processing automation
- Digitally reimagine and enable the property development process
- Leverage the full value of data to proactively guide the quality and appropriateness of new development applications

By Delivering on…
(Objectives)

- A reduction in the overall time for new development approvals
- An improved customer experience
- An internal skills development roadmap within Oakville for project data management
- A future-fit roadmap that is resilient to an evolving policy landscape that impacts building codes, sustainability goals, and the shift to BIM.
- The creation of a common data environment (CDE) to contain all new digital application information for total team accessibility
- Automation and optimization of internal workflows and processes
- The establishment of intelligent ‘stage gates’ to validate all new submissions quality and completeness automatically and free up capacity of Oakville resources

So Oakville can…
(Outcomes)

- Empower the Oakville community to actively shape their places and improve ‘ease of doing business’
- Build a highly skilled future-ready workforce
- Deliver future-proofed public services that are scalable and continually improving
- Lead the change for new digital property development services in Canada
- Create conditions for a new services delivery model that brings new economic opportunity
- Configure internal workflows to support a centre-led organizational structure
- Be the catalyst for sustainable development

How will delivery on the vision **benefit** Oakville and the community?

	Competitive advantage	Economic value	Customer experience
Goal 1 **Develop or adopt standards for application submissions to streamline integrations and facilitate data processing automation**	• Digitising processes to provide more effective customer service • Building an integrated data warehouse to be able to provide any data needed to staff at a moments notice	• Cost reduction by automating time-consuming and repetitive processes • More accurate data on systems allows for better decision making	• Become more customer focused since tedious processes are now automated • Improve experience with digital touchpoints for ease of reporting both internally and externally
Goal 2 **Digitally reimagine and enable the property development process**	• Investing into technology to be able to innovate faster than the market • Provide high quality service and engagement to a large number of developers, making people want to use Oakville applications/platforms	• Attract more of the right kinds of projects by being the 'development partner' of choice • Unlock opportunities in the ecosystem, helping business lines work from a common data base	• Provide a positive and intuitive platform for customers and Oakville workforces with fast turn around times for approvals and meaningful feedback processes
Goal 3 **Leverage the full value of data to proactively guide the quality and appropriateness of new development applications**	• Data insights processing and intelligence to provide additional value • Co-ordinator of partnerships and relationships across the entire market base	• Evolve beyond 'what is permissible', towards 'what is best' as indicated by data and insights. Enable better community engagement and shorten time to approval.	• Oakville will be seen as the 'business enabler', creating additional value to customers and the market • Become a trusted advisor to customers and during their project incubation period to build and maintain loyalty

Goals, Objectives and Standards Defined

DEFINING GOALS

An enabler of the Vision statement. By achieving this, the vision would be made ‘true’. This is designed to be ambitious, yet tangible.

This also recognizes that the case for transformation carries a need for internal process refinement, technology adoption, and elevating the standard of applications for customers and industry (architects, engineers, developers, builders).

DEFINING OBJECTIVES

An objective refers to the specific steps a company will take to achieve a desired result. The result is the goal.

Objectives are measurable and tangible. These define the organization’s trajectory and velocity. These serve as long term guidelines for the planning department.

DEFINING STANDARDS

Project standards are the rules and conventions governing the way in which a project will be conducted.

A standard is a document, established by consensus and approved by a recognized body, which provides for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.

Goals, Objectives and Standards

GOAL 1

Develop or adopt standards for application submissions to streamline integrations and facilitate data processing automation

It's a two-way street:

For Oakville to reach its potential, the quality and digital integrity of submissions must be aligned to the workflows and technology processes that drive efficiency, accuracy and automation.

"In computer science, garbage in, garbage out (GIGO) is the concept that flawed, or nonsense (garbage) input data produces nonsense output."

Garbage in, garbage out – Wikipedia

OBJECTIVES

- **Submission stage gate**: Establishing the minimum quality expectation for receipt of new development applications should elevate the integrity of 'data in'.
- **Prioritization**: defining a workflow and project KPIs should assist in up-front prioritization of submission, based on internal capacity, project size and complexity, and strategic importance.
- **Format**: Create a minimum requirement for CAD and Building Information Modelling (BIM) format submissions by defining the minimum threshold for Level of Development (LOD) should improve the case for automation, data sharing, and accuracy of work.
- **Integration**: Establishing the data standard that enables ease of project data integration into a common data environment (repository)
- **Centralization**: Configuring internal workflows to support a centralizing and channelling flow of information should improve transparency and tracking of process and accountability.

STANDARDS

- Ontario Public Service Data Integration Data Standards
- **ISO 19650-1 and 2** standards for information Management using BIM as per BS 1192:2007+A2:2016 and PAS 1192-2:2013. based on UK BIM L2 model

Referenceable:

- Dubai BIM standards **and building code**
- Dubai BIM Templates
- Sinagpore e-plan submission standards

Goals, Objectives and Standards

GOAL 2

Digitally reimagine and enable the property development process

“Being digital, instead of doing digital”

This is about becoming a driver for change. A digital service defines the business processes and is not defined by them.

Digital means business processes changing to fit with the computing world and not the other way around.

We shouldn’t mimic offline processes in an online way.

OBJECTIVES

- **Customer First Culture**: To be digital, the culture within Oakville must be that you deliver customer needs; features that are beneficial to the development approval process or quick turnaround or low cost.
- **Instant Feedback**: in a digital world, Oakville workforce and customers should expect instant feedback to their requests.
- **Real-time**:a digital platform should expect to receive requests 24 hours a day, every day. It should be available on demand. And the data it uses/returns should be the latest. Eventual consistency is a valid architectural approach, but this should be measured by network and automated processing latency and not business process latency.
- **Automated**: a digital service should include as much computer processing as possible without the need for manual intervention.
- **Intelligent**:your digital services should do all the heavy lifting. Oakville services should be able to handle the rawest bit of information from the customer and ubiquitously calculate, amalgamate, massage and convert it.
- **Online**: a digital service should be accessible anywhere with an internet connection, with no limitation on device and usage.
- **Ease of use**: Bring what is most important to the workforce and the customer to the forefront.
- **Regular scalability and improvements**: A digital platform should be improving itself as often as necessary.

STANDARDS

- Ontario Digital Service Standard 2021
- Canada Digital Standards Playbook
- Ontario Public Service Data Integration Data Standards
- Information technology standards | ontario.ca

Required:

- Oakville data integration standard for new e-plan submissions

Goals, Objectives and Standards

GOAL 3

Leverage the full value of data to proactively guide the quality and appropriateness of new development applications

Transition from "validating applications" to "enabling better planning decisions"

The planning dept. focuses effort on ensuring that applications are within acceptable zoning and site constraints and according to building code.

The Town of Oakville has the power to do more with its data, by providing insights to its customers about what the true potential of a development could by based on contextual information. Oakville could provide insights as a service and advise on best planning approach to speed up rezoning and improve overall sustainable development.

OBJECTIVES

- **Leverage the power of AI**: Harnessing machine learning can be transformational, but for it to be successful, Oakville needs leadership from the top. This means understanding that when machine learning changes one part of the process then other parts must also change. This can include everything from submission scrutiny and approval, to issuing real-time feedback, and even hiring and incentive systems.
- **Data Analytics**: Having data is not enough, it's what we do with it that matters. While this process can certainly be automated, empowering the Oakville workforce to leverage analytics in workflow as well as the performance management will be critical. Oakville should develop the skills become more capable in descriptive analytics, diagnostic analytics, predictive analytics, and prescriptive analytics.
- **Real time master planning**: Zoning can often lead to time and delay in new developments. By leveraging project and contextual data, zoning can become an enabler of new developments, adapt to changes based on data and evidence, and support community-buy in.
- **Incentivize**: Understanding what a new development has the capacity to become, brings the opportunity to incentivize customers to do better for shared value.
- **Continuous updates**: understand that the market is ever-evolving. Provide ongoing insights to projects that are completed to support their sustainability and modernization roadmap.

STANDARDS

- Responsible use of AI in Canada
- Canada Digital Standards Playbook
- Ontario Public Service Data Integration Data Standards
- Data Analysis **[ISO 9001] 8.4**

"Just as electricity transformed almost everything 100 years ago, today I actually have a hard time thinking of an industry that I don't think AI (Artificial Intelligence) will transform in the next several years." **~Andrew Ng**

OAKVILLE

Property Development Digital Plan: A Digital Transformation Solution

Digital Plan and Roadmap

AECO innovation lab

in partnership with

Deloitte.

Introduction | Oakville's Digital Plan

Transforming the Digital Vision into…

The digital transformation journey began with the development of the Town of Oakville's renewed Digital Vision and goals:

Vision Statement:

- Implement a modern and fully integrated property development service platform that supports Oakville's vision to be one of the most digitally connected and livable communities in Canada by 2030.

Goals:

1) Develop or adopt standards for application submissions to streamline integrations and facilitate data processing automation
2) Digitally reimagine and enable the property development process
3) Leverage the full value of data to proactively guide the quality and appropriateness of new development applications

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After defining the Digital Vision and ambition for the Town of Oakville, a Digital Plan was created to enable the Town to move forward in pursuit of an integrated, digital-first, customer-focused approach.

Key Insights

- The Digital Plan enables the digital transformation of Oakville's property development services, which spans across many departments and impacts everything from pre-consultation through to the final inspection.
- The Digital Plan emphasizes the impacts on the Town's 4 Pillars – People, Process, Technology, and Data.
- The Digital Plan sets out short term and long terms goals and actions for the Town to take to achieve Oakville's Digital Vision through a series of tasks.

This deliverable presents the Digital Plan for the Town of Oakville and identifies the key projects and activities required to enable the Digital Vision.

…a Digital Plan

Recall |Digital Vision and Four Pillars

Oakville's Digital Vision for Property Development Services

Implement a **modern and fully integrated** property development service platform that supports Oakville's vision to be one of the **most digitally connected and livable** communities in Canada by **2030**.

Oakville's Digital Vision for Property Development Services

Collaborative and Generative City Planning that maximizes the use and value of Oakville's land and benefits to its communities.

Modelling Town Assets to ensure newly built infrastructure is digitally captured and managed.

Emergency Planning to analyze the impacts and need for emergency services in new developments.

Digitized Infrastructure to aid in analyzing development applications and capture new infrastructure.

A Town Hall that will have a better understanding of and more information regarding new developments for council and residents to discuss.

Environmental Simulations to ensure Oakville's growth is sustainable and resilient.

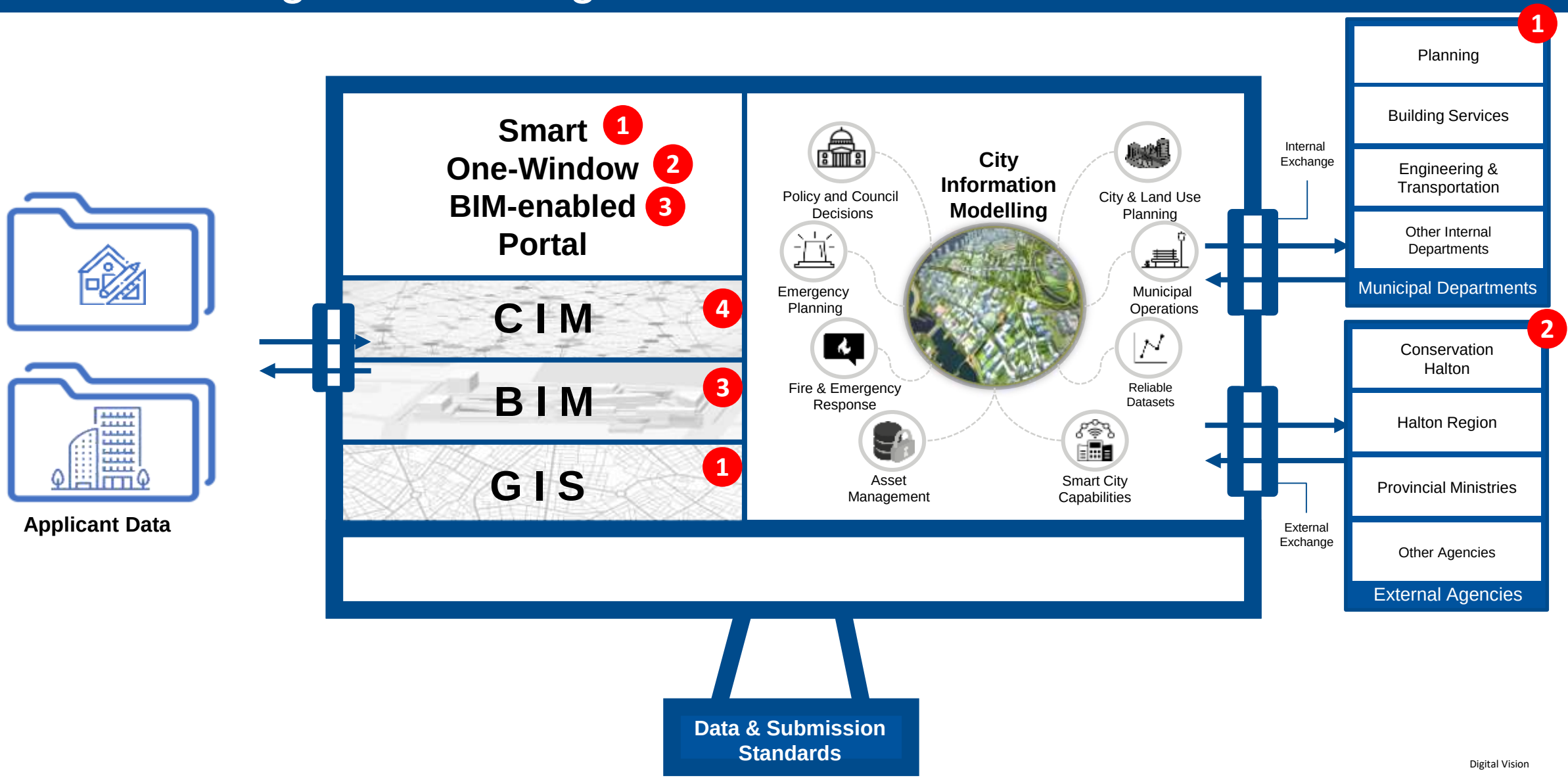
Smart City Applications to create more integrated, data-centric communities.

Transit Planning to review the need for new transit options in areas of new development.

Modelling of Parks and Greenspace to analysis the impact development has on parks and canopies.

City Departments that can make faster, more informed decisions on development applications through the use of GIS and BIM to make Oakville the most livable Town in Canada.

Achieving Oakville's Digital Vision



Recall | Oakville's Digital Vision – The Opportunity

Efficient and Streamlined Processes

- More efficient, streamlined processes that allow staff to divert their attention from administrative tasks to more important activities.

Higher Quality Data

- Higher quality data that allows municipal staff to make more informed decisions in both property development services and in other business areas, including integration with municipal asset management teams

Improvement Areas

Higher Quality Submissions

- Higher quality submissions that improve the intake of applications and result in less time spend seeking clarifications and addressing deficiencies.

Enhanced Collaboration

- Enhanced collaboration and communication between staff, external agencies, and applicants.

Enhanced Visualization & Analysis

- Better visualization and analysis opportunities to inform staff, applicants, councillors, and residents of a project's true impact on the area.

Oakville has the opportunity to become a digital leader in the property development space both provincially and nationally while addressing a number of existing pain points and significantly improving their own operations.

Recall |The Four Pillars

To enable the Digital Plan, key components were identified – people, processes, technology and data – when developing the Town of Oakville's Digital Vision and ambitions. These four pillars are the foundation of Oakville's Digital Transformation.

PEOPLE

Clear requirements on what staff need to adequately perform their role throughout the digital transformation, and clear requirements and assistance for applicants to ensure they can meet the new requirements.

PROCESSES

Identifying inefficiencies, streamlining existing processes and automating low-value/high-effort tasks, and encouraging collaboration between staff, the applicant, and external agencies.

TECHNOLOGY

Adoption and use of flexible, scalable technologies to process applications, communicate and collaborate with stakeholders, and harnessing these technologies to unlock new opportunities in the property development process.

DATA

Creating a single source of truth for the Town to receive and review data in a standardized format throughout the property development process while adopting standards for the intake of documents to ensure consist, quality submissions

The Digital Plan’s Foundation

Turning the Vision into a Plan

OBJECTIVE

A clear Digital Plan is a key enabler to ensuring the successful transformation of the Town of Oakville's property development approval service. The Digital Plan provides a clear, phased plan to take Town's Vision and transform it into a tangible plan.

APPROACH

1 Alignment of Digital Vision

Alignment of the Digital Vision across the Town of Oakville's key stakeholders to enable the Digital Plan

2 Establishment of a Phased Approach

To achieve the Digital Vision, a four phased approach was identified, and recommended over the next ten (10) years

3 Prioritization of Key Programs and Activities

Programs and Activities were prioritized based on their ability to streamline efficiencies and processes to unlock new opportunities for the property development process

4 Impact on Tech, Processes, People & Data

Determine the impact of each program on the four pillars – technology, processes, people, and data – to initiate, implement, and ultimately achieve the Digital Vision.

OUTCOME

The Digital Plan identifies tasks, programs and activities according to the four phases by:

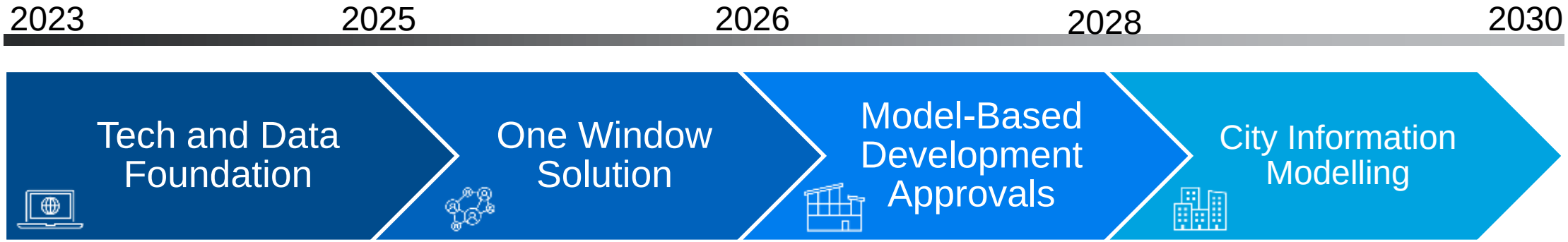
- Identifying goals, objectives and actions to be undertaken by the Town
- Identifying the implications on workforce skills, technology considerations, and benefits realization

…and enables short and long-term planning with:

- A clear vision and plan for digital transformation

Oakville's Digital Plan – The Four Programs

To achieve the Digital Vision set out in Phase 1 of the project, a series of four programs are recommended over the next 10 years. These programs, listed below, are to be completed in series and build off of the success of the previous programs to streamline processes, enhance reviews throughout the property development process, encourage collaboration, and unlock new opportunities both within and outside of the property development process.



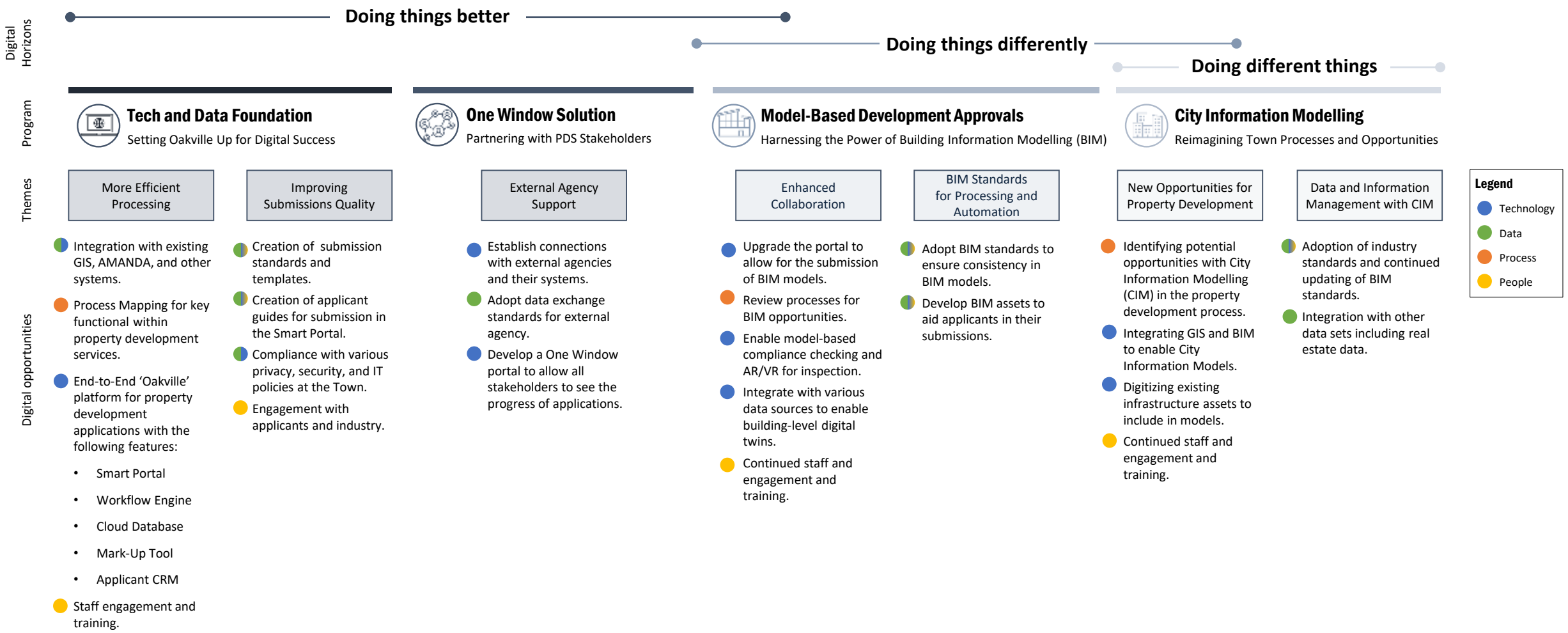
Tech and Data Foundation focuses on truly digitizing Oakville's processes. It lays the groundwork for Oakville's Digital Vision by developing standards across the property development process and acquiring technology that allows for seamless submission, circulation, review, and approvals for both the Town and its applicants.

One Window Solution embraces larger scale collaboration within the greater property development ecosystem. In this phase, the Town will work with external agencies involved in the property development process, incorporate their needs into application intake, and integrate with their systems to create efficiencies for all parties.

Model-Based Development Approvals harnesses the information contained in building information models that will provide Town staff significantly more information to conduct their reviews, introduce opportunities to automate low-value tasks, and further collaboration efforts between staff and the applicant.

City Information Modelling will allow the Town to leverage models submitted to the Town to develop a city model that can be used for a wide variety purposes, including, but certainly not limited to, additional review possibilities throughout the property development process as well as opportunities to improve other business areas in the Town.

Property Development Digital Plan



The Digital Plan – Build, Buy, or Partner?

There are many paths forward to accomplish the goals and objectives set out in the digital vision.

There are two main ways to acquire technology – build it or buy it. Oakville does not have the internal capacity to build a solution from scratch, but they do have many of the key pieces in place that are required to fulfill the Digital Vision. Furthermore, some of these components do not exist in the current market. For example, no one piece of software does everything that is required to complete Program One as described, nor is there anything that solely addresses all the requirements per the Vision.

The **first step** in digitally transforming Oakville's Property Development Service is to determine whether the Town is going to wait for a suitable product to come to market *or* attempt to integrate the component parts necessary to build a properly functioning solution.

This plan and roadmap assumes that Oakville decides to **acquire the missing** pieces then integrate the tools already in place at the Town to create a cohesive solution that will meet the Town's needs and have the required functionalities set out in vision.

A **third option** also exists – partnerships. There is a lot of work that is being done in this space in the public and private sector. For example, there are efforts underway to streamline and centralize the development approvals process, to develop BIM standards for municipalities, and to identify how CIM can aid municipalities.

Existing Vision Components at the Town:

- GIS
- Mark-up Tool
- Payments Tools
- Customer Relationship Manager
- Applicant Portal
- Document Storage
- Permitting Software
- City Modelling Tool (in limited capacity)

Missing Vision Components at the Town:

- Document Circulation (currently being procured)
- A 'Smart Portal'
- The integration of all these pieces
- BIM tools and integrations
- CIM integrations
- Submission standards (CAD, BIM and CIM)

Program One – Technology and Data Foundation

Program One – Technology and Data Foundation

Charter

Description

Program 1 focuses on establishing the technology and data foundation for Oakville's Property Development Services.

Upon completion of this Program, Oakville will be able to seamlessly process applications from the initial intake through approval while educating the applicants on the process and keeping them informed throughout. The Town will be receiving higher quality, more consistent submissions that will allow for the automation of low-value/high-effort tasks allowing staff to focus on more important issues.

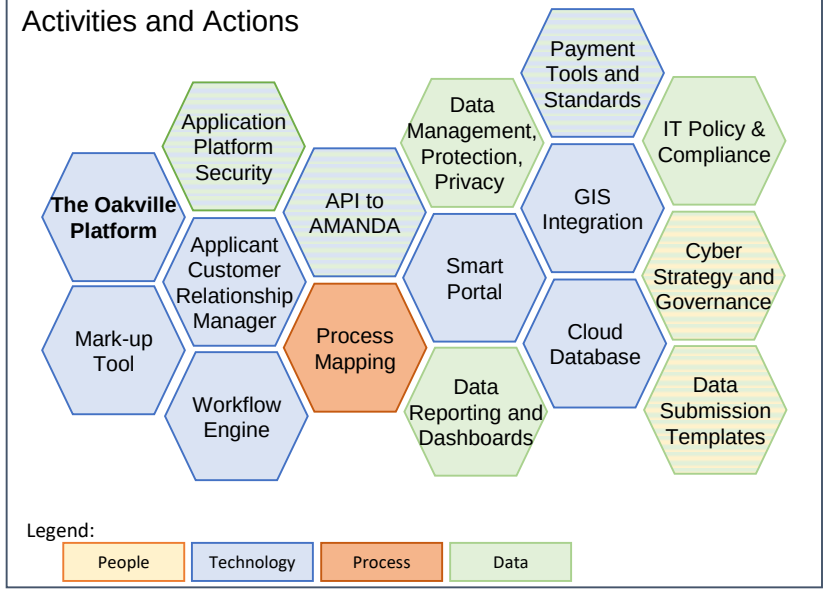
Goals

- Equip Oakville with the technology required to conduct the intake, circulation, review, and internal communications for property development services in one seamless system with the aid of automation.
- Establish data standards for Oakville's property development services that will form the basis for future standards development

Objectives

- Improve the submission process for applicants by providing information regarding the requirements and process by application based on project type, size, and location.
- Improve the intake process by ensuring applicants can easily input all required information for their application.
- Automatically ingest information, documents, and drawings into a centralized database for each application.
- Automatically notify the appropriate staff of the completed application and allow them access to the files.
- Efficiently review drawings and communicate deficiencies with other staff and the applicant.
- Ensure Oakville's property development processes, technologies, and data comply with various security standards and policies.
- Create templates for applicants to ensure applications are consistently ingested to allow for easier and/or automated analysis and processing.

Activities and Actions



Implications on Workforce Skills

None — High

Planning | IT | Building | Transportation & Engineering

Skills	Execution	Sustainment	Collaboration
Data Engineering	X		
Cloud Platform	X	X	
GIS	X	X	X
CRM	X	X	
Customer Experience	X	X	
Digital Application Processing	X		X
Cyber	X		

Technology Considerations

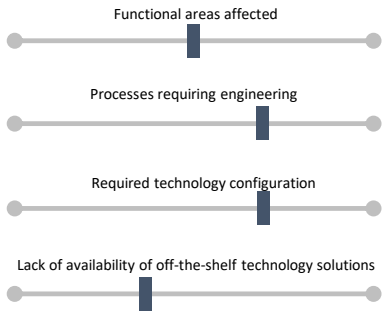
Current:

- Amanda backend and Portal
- Bluebeam / e-plans
- Online payment system
- GIS viewer/adapter

Future:

- CRM portal & client interaction management
- Cloud platform and data repository
- Automated Quality Management System (QMS)
- CAD (template editing and maintenance)

Complexity



Benefits Realization (Impact)

Legend: Impacted

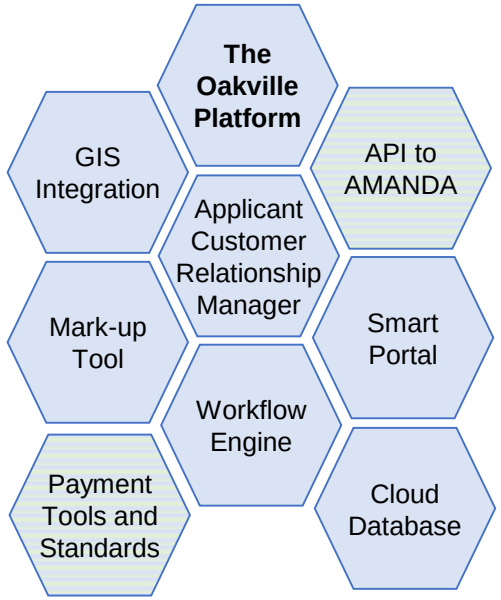
Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

- Improves inefficiencies throughout property development process and saves significant effort spent time-consuming low value activities.
- Addresses a significant pain point for internal stakeholders regarding when to engage with the process and sequencing throughout the approval process.
- Improved quality of submissions through a submission stage gate and automation of menial tasks.
- Improved transparency of process and customer experience.
- Creates foundation for future platform expansion and scalability.

Program One – Technology and Data Foundation

Activity Information - Technology

Activities and Actions



API to AMANDA

Description: The creation of an API that will allow for the new 'Oakville Platform' to connect into the existing AMANDA database to retrieve and update information related to property development services. This includes investigating ways to extract existing permit information to the new platform and accessing legal information pertaining to easements and titles.

Benefits: Allows the system to interact with AMANDA as needed to obtain key information.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Applicant/Customer Relationship Manager

Description: A CRM with embedded identity and access management that allows Town staff to securely and efficiently interact with applicants regarding the status and requirements of applications. This also includes a public identity management system as well as a system to handle inquiries.

Benefits: Efficient applicant/customer relations to improve communication and save time resolving issues.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Smart Portal

Description: A robust, interactive portal that informs applicants of the required information and processes, allows them to submit the relevant information to the Town, and checks to ensure all required information is included upon submission.

Benefits: Clear, consistent application intake and informed applicants which improves application quality.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Payment Tools and Standards

Description: A single payment tool that complies with Town standards and protocol to allow for applicants to pay application fees in the system.

Benefits: Allows for a seamless, secure payment experience for customers submitting applications and allows the Town to receive payments and issue refunds as required by Town policy and/or other relevant regulations through a single tool.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Workflow Engine

Description: Identifies and makes consistent the order in which applications flow through the Town, automatically tracking progress and notifying staff when they are required to complete a task.

Benefits: Complete and consistent workflows and processes for Town staff to minimize delays, errors, and miscommunications.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

The Oakville Platform

Description: The integration of the other technology parts to create a holistic system that captures the complete internal property development process:

1. Applicants visit the smart portal to learn about the requirements (some of which are based on GIS), then, based on those specific requirements, submit their application to the Town via the smart portal. Payments are made through the payment tool.
2. Submitted documents are stored in the cloud database where all staff relevant to the project can access them. An API to AMANDA reads and writes relevant information to the platform.
3. The workflow engine notifies staff that the application is ready to review.
4. A mark-up tool is used by all staff to review drawings.
5. Communications and status tracking, , including final approvals, are handled through the CRM.

Benefits: Better informed applicants, higher quality submissions, more easily accessed information, streamlined processes, automated initial analysis, status tracking.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Mark-Up Tool

Description: A tool that allows relevant staff across all departments to review (in series or parallel) PDF submissions, highlight deficiencies, place comments, and summarize the comments into a list.

Benefits: Allows easy, consistent way for staff to review drawings, generate lists, and collaborate

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

GIS Integration

Description: Integrating GIS layers for the Town and other jurisdictions into the application process to identify application requirements based on project location and geographic rules or considerations.

Benefits: Automatically identify geographic requirements for each application based on the location of the project and provide that information to the applicant during submission.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Cloud Database

Description: A database where all files submitted to Town will be uploaded and accessible to relevant staff with versioning control to ensure up-to-date information is stored in a central location.

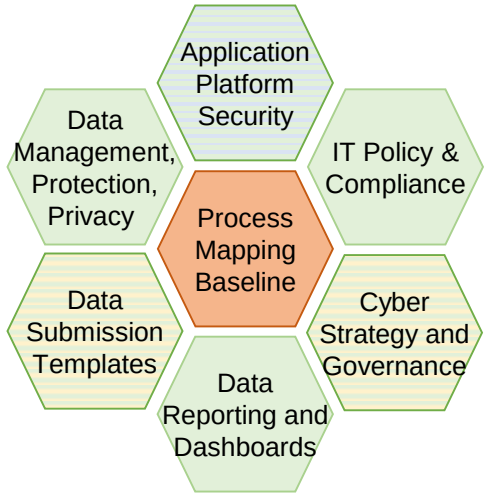
Benefits: One centralized location to store documents to ensure everyone can access files as needed.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Program One – Technology and Data Foundation

Activity Information – Data, Processes, and People

Activities and Actions



Application Platform Security

Description: Application security is the process of developing, adding, and testing security features within applications to prevent security vulnerabilities against threats such as unauthorized access and modification.

Benefits: Security measures at the application level aim to prevent data or code within the app from being stolen or hijacked. Platform security enables the securing of an entire (all layers) platform by using a centralized security architecture or system.

Customer Experience	Operational Efficiency	Enhance Internal Collaboration	External Agency Integration

Cyber Strategy and Governance

Description: Cybersecurity governance is a set of policies and processes to protect an organization from cyber threats. You can create an IT security governance program by following a few basic principles.

Benefits: Cyber strategy and target operating model development establishes security strategies aligned to business objectives, quantifies risks, evaluates true cost and determines the effectiveness of platform roll-out.

Customer Experience	Operational Efficiency	Enhance Internal Collaboration	External Agency Integration

2D Data Submission Standards & Templates

Description: Creation of 2D CAD and data submission standards and templates for applicants to use for their submissions based on Town requirements to capture all desired information in the desired format.

Benefits: Consistency between applications to allow the smart portal and other technology to automate some processes and aid in streamlining the review process.

Customer Experience	Operational Efficiency	Enhance Internal Collaboration	External Agency Integration

Data Management, Protection, and Privacy

Description: Data management, protection and privacy guidelines to define who has access to data, tools and policies to restrict access to the data, data ownership, and updating.

Benefits: Proper data management, protection and privacy will ensure that data is safeguarded and reliable. Data protection includes the technical methods and measures that ensure the integrity and confidentiality of data. Data protection safeguards information from loss through backup and recovery.

Customer Experience	Operational Efficiency	Enhance Internal Collaboration	External Agency Integration

Data Reporting and Dashboards

Description: Data reporting and insights tools integrated with the Oakville Platform to track the amount of time applications are under review, how long it takes to approve applications, and identify areas that need further refinement.

Benefits: Having accurate reporting and analysis will give the Town insights into how well they are processing their applications, common issues that affect processing, and identify opportunities for improvement.

Customer Experience	Operational Efficiency	Enhance Internal Collaboration	External Agency Integration

IT Policy Compliance

Description: The rules, regulations, and guidelines for proper usage and maintenance of technological assets to ensure their ethical and acceptable use and assure health, safety and security of data, products, facilities and users.

Benefits: IT policies and procedures make the employees informed and aware of their obligation and responsibility in the usage of information technology while being an employee in the business. IT policies and procedures outline the expectations that employers would look forward to being executed well by their employees particularly on how they would handle IT-related matters.

Customer Experience	Operational Efficiency	Enhance Internal Collaboration	External Agency Integration

Process Mapping Baseline

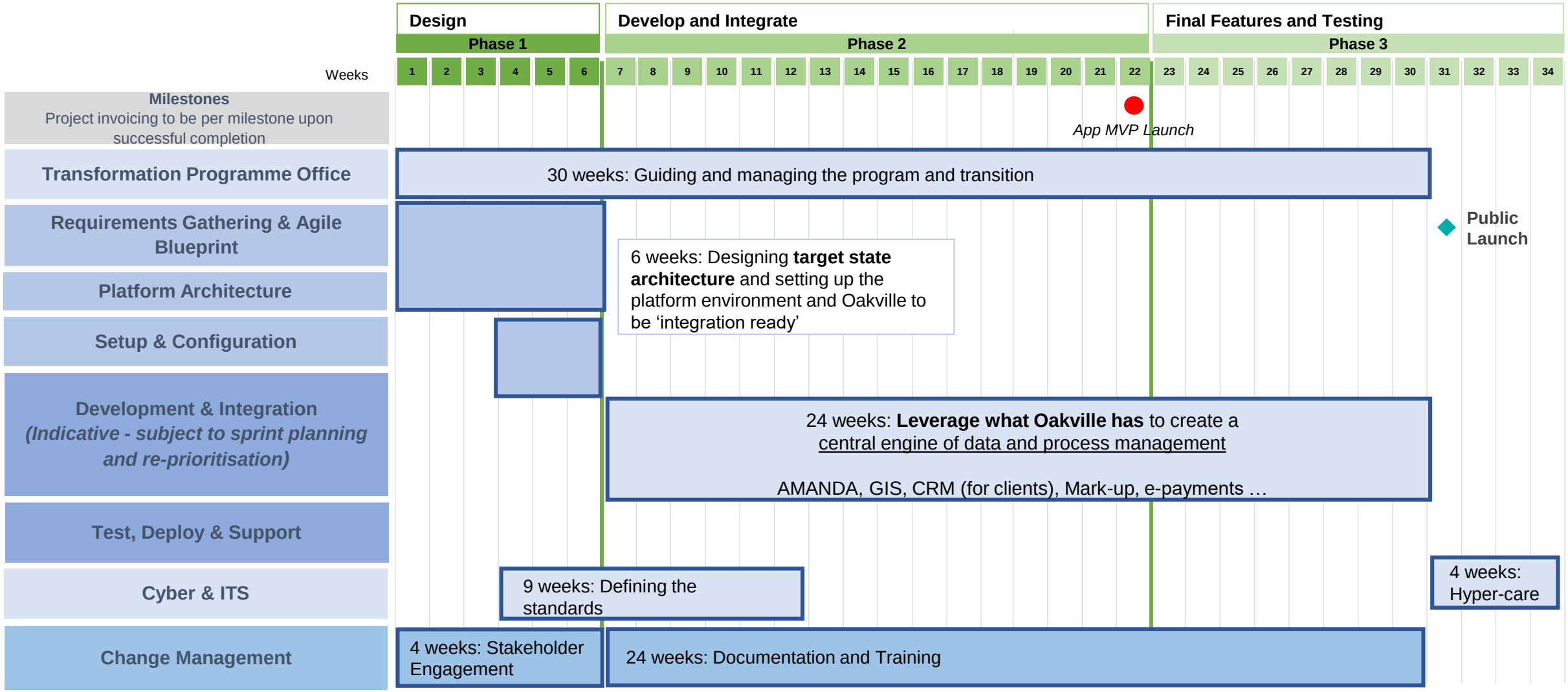
Description: Visually map out workflows and processes. It involves creating a process map, also referred to as a flowchart, process flowchart, or workflow diagram for reviewing of departmental workflows as well as external agency workflows from intake to approval to identify how applications are processed and how they can be improved prior to implementing processes in the workflow engine. It is also important to ensure that new processes meet the legislative requirements and to review any changes in requirements to ensure the system remains compliant.

Benefits: Develop a more concrete understanding of first phase platform processes and workflows to baseline and track performance, to identify opportunities for improvement and automation. Enable automation of said workflows through next stage process bionics.

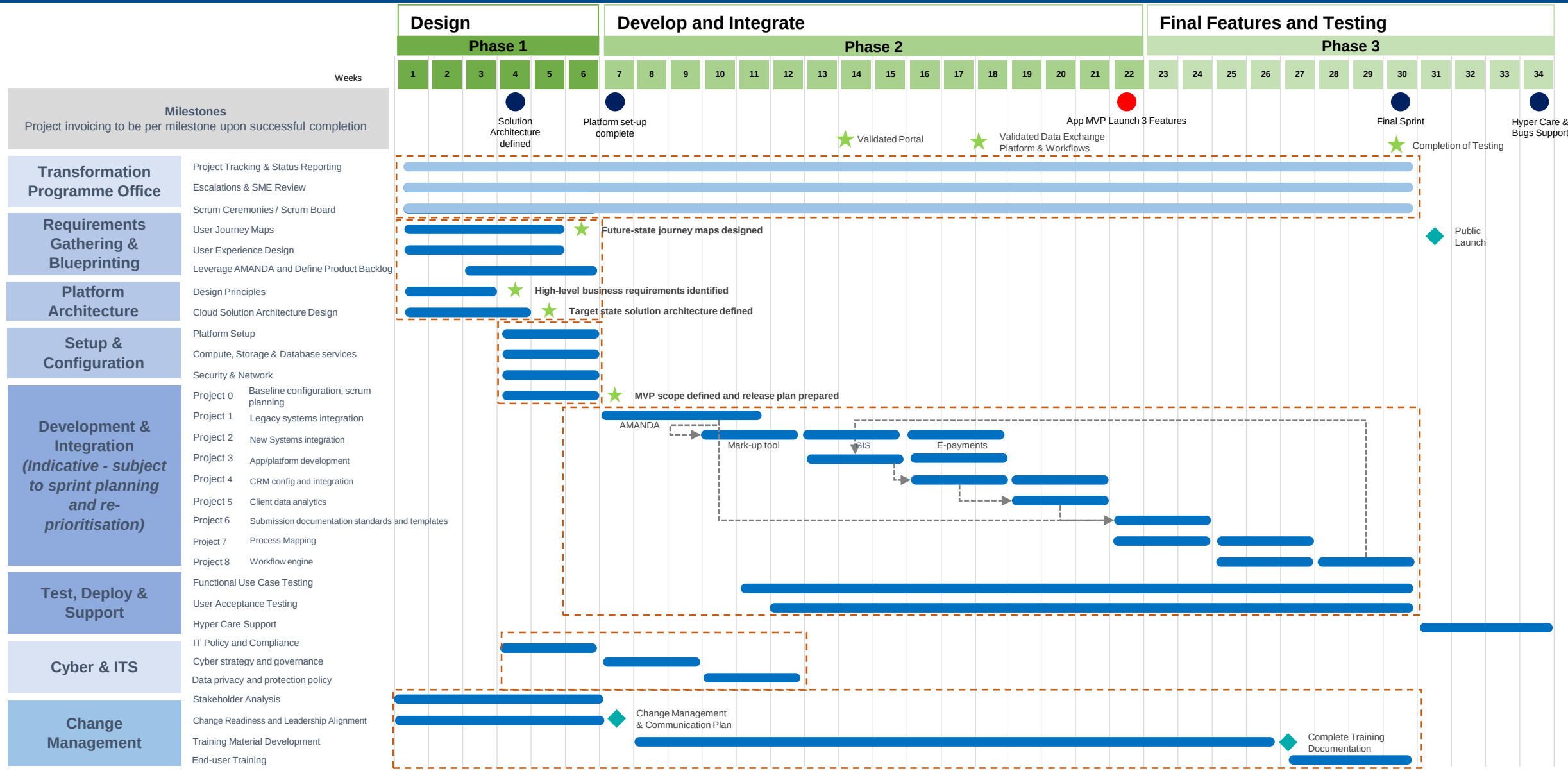
Customer Experience	Operational Efficiency	Enhance Internal Collaboration	External Agency Integration

Typical Timeline| Program One: Technology and Data Platform

The proposed project timeline spans 34 weeks (8 Months) and aims to deliver a MVP and digital portal platform based on Cloud Architecture that will provide Town of Oakville the foundational and scalable capability required to unlock value in the future. Agile process will allow for reconfiguration and realignment during process.

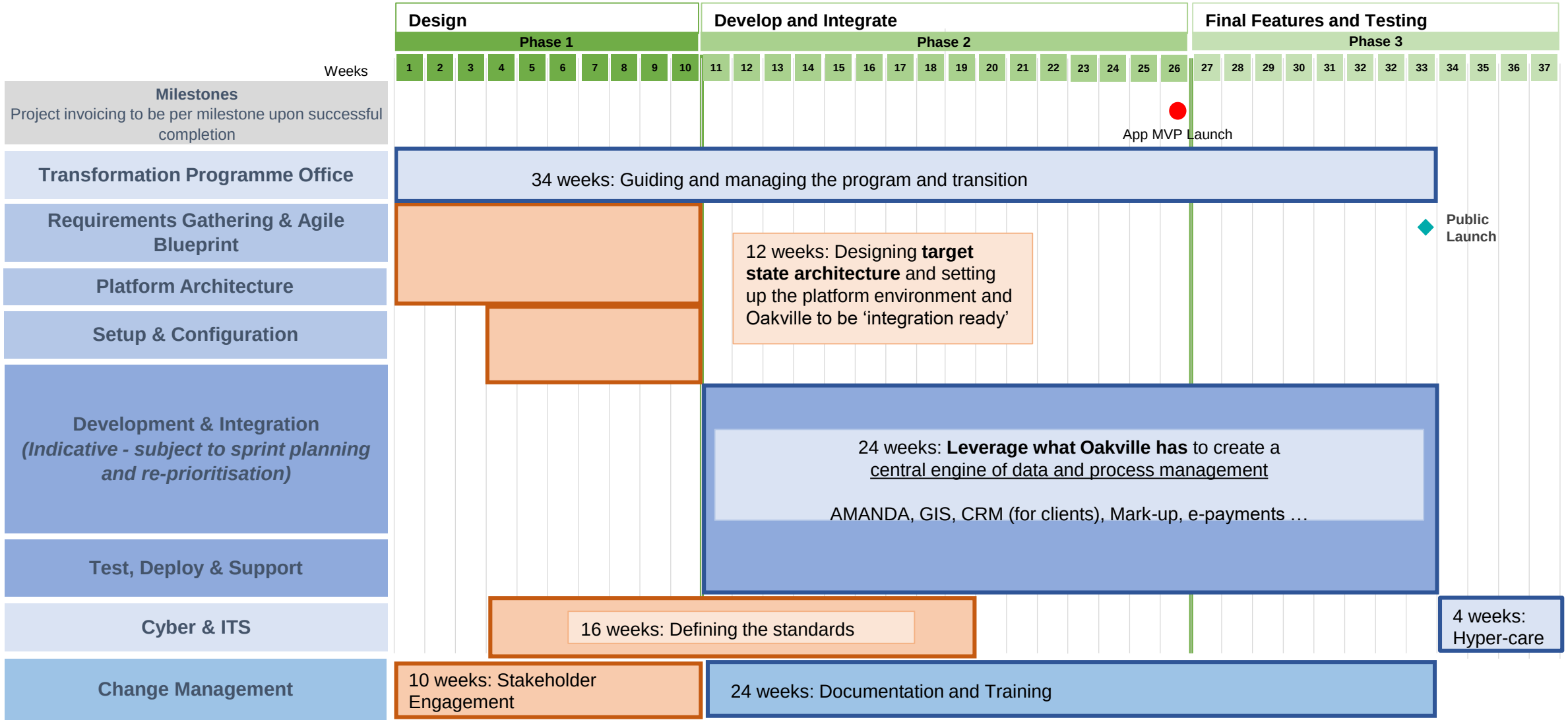


Detailed Timeline (Typical) | Program One: Technology and Data Platform



Extended Timeline| Program One: Technology and Data Platform

The proposed extended project timeline spans 38 weeks (10 Months) allowing for up to 50% additional time associated to workstreams that require stakeholder engagement, approval and access to information. Hybrid-Agile process will allow for reconfiguration and realignment during delivery.



Program One – Alignment with Goals

Program One works to resolve the challenges that Oakville faces internally through the integration of technologies and streamlining of processes.

GOAL 1 :
Develop or adopt standards for application submissions to streamline integrations and facilitate data processing automation

Objectives

- **Submission stage gate**: Establishing the minimum quality expectation for receipt of new development applications should elevate the integrity of 'data in'.
- **Prioritization**: defining a workflow and project KPIs should assist in up-front prioritization of submission, based on internal capacity, project size and complexity, and strategic importance.
- **Format**: Create a minimum requirement for CAD and Building Information Modelling (BIM) format submissions by defining the minimum threshold for Level of Development (LOD) should improve the case for automation, data sharing, and accuracy of work.
- **Integration**: Establishing the data standard that enables ease of project data integration into a common data environment (repository)
- **Centralization**: Configuring internal workflows to support a centralizing and channelling flow of information should improve transparency and tracking of process and accountability.

GOAL Alignment
Program One creates submissions standards for property development applications while ensuring streamlined, efficient processing throughout the review and approval process.

Objective Alignment

- **Submission stage gate**: Program One involves the development of submission standards which will promote higher quality submissions.
- **Prioritization**: The technology proposed in Program One – in particular the document circulation tool – should have the ability to prioritize certain applications.
- **Format**: The proposed development of standards under Program One will include CAD standards that will result in improved submissions and allow for faster processing and review of applications.
- **Integration**: Program One focuses on creating a single (internal) source of truth for all stakeholder involved in the property development process and integrating the various tools and technologies to create it.
- **Centralization**: The technologies and process reviews in Program One promote centralization – create a single source of truth for all stakeholders and ensuring that internal communications are transparent

Program One – Benefits

Program One will bring many benefits to the departments involved in the Property Development at the Town through the integration of technology and streamlining of processes.

How does Program 1 help?

- Creation of clear, location-based processes for all groups involved in the property development process allowing for more efficient processing of applications, reduced communication errors, and less rework.
- Creation of a single source of truth for all groups involved in the property development process allowing all groups to have the most up-to-date information and access to all comments, including the applicant, reducing delays.
- More informed applicants through the GIS-enabled Smart Portal.
- Sets out clear standards for submission to promote higher quality submissions.
- Allows for the capture of more, better quality information pertaining to the property development process.
- Leading jurisdictions have reported that approvals occur 40 – 70% faster when Program 1 is complete.

Program Two – One Window Solution

Program Two – One Window Solution

Charter

Description

Program 2 builds off of Program 1's *Oakville Platform* to further enhance property development services by focusing on integrations with external agencies that provide comments and feedback on applications.

The result of this program will be a fully integrated *One Window* dashboard.

This program, while ultimately reliant on external support, will have a significant impact on the customer experience, as they will be able to provide project information through one system, and Town staff and applicants will be able to see the status of these external reviews.

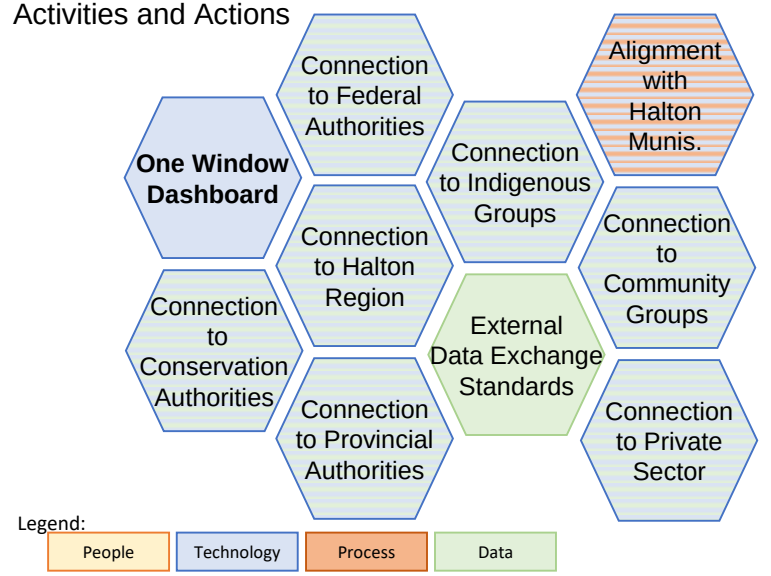
Goals

- Establish connections with key external stakeholders that interact with Oakville throughout the Property Development process to integrate their requirements and processes and create a One Window approach for applicants.
- Effectively communicate information and data between the Town and external agencies throughout the property development process.

Objectives

- Identify needs from external agencies and communicate those needs to applicants early in the property development process.
- Create a *One Window* dashboard that will provide a single point of entry for property development applications and provide insight and transparency into the progress of applications across all stakeholders involved in the application.
- Establish digital connections with external agencies to provide access to information and documents collected by the Town on their behalf.
- Develop clear data standards that will allow the Town to capture relevant data in a format that is appropriate for the Town and the external agencies.

Activities and Actions



Implications on Workforce Skills

Skills	Execution	Sustainment	Collaboration
Data Engineering	X		
GIS	X	X	X
Platform API	X		

Technology Considerations

Current:

- Email correspondence with external agencies
- Traditional communications (i.e. paper-based)

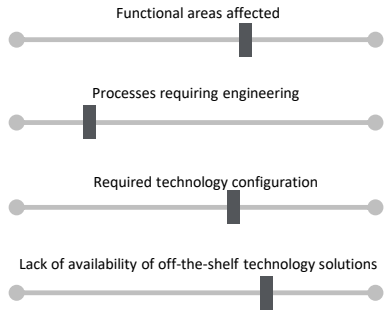
Intermediate:

- The Oakville Platform (from Program One)

Future:

- 'One Window' system, automated notifications, APIs to connect to external agency systems
- Integration to existing solutions and platforms at external agencies

Complexity



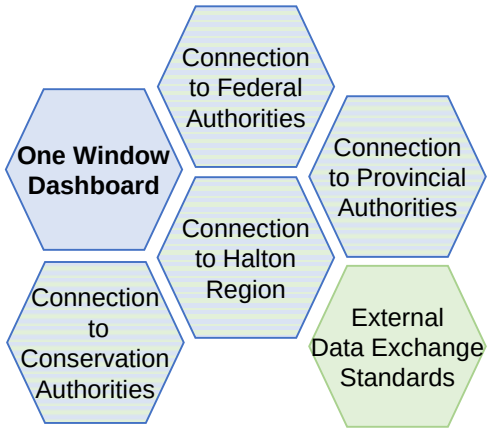
Benefits Realization (Impact)

- Better educates applicants on external agency requirements allowing them to better navigate the property development process.
- Improves the customer experience by allowing applicants to submit their application into one system that captures all the required information as opposed to multiple systems that required the duplication of effort.
- Internal efficiency resulting from better integration with external agencies allowing Town staff to better coordinate their efforts and track progress instead of having to send out emails and wait for responses.

Program Two – One Window Solution

Activity Information

Activities and Actions



People | Technology | Process | Data

External Data Exchange Standards

Description: Development of standards that will allow the Town to identify then capture the information required by external agencies on submission and minimize the delays and risks associated with external agencies.

Benefits: Allows for collection of all information required in the process by all parties at the start of the project.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Connection to Halton Region

Description: Connection into Halton Region's system that will allow for the Town and Region to seamlessly share files, comments, and progress on property development applications.

Benefits: Integrations to improve processing and provide insights into status of applications.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Connection to Provincial Authorities

Description: Identify and establish connections with key provincial ministries including Transportation; Natural Resources; Environment, Conservation and Parks; Municipal Affairs and Housing; Long Term Care; and Education as well as agencies like Metrolinx, the Ontario Land Tribunal, the Ontario Land Registry Office, and MPAC which are involved in the property development space to share information, comments, and progress on property development applications.

Benefits: Integrations to improve processing and provide insights into status of applications.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Connection to Conservation Authorities

Description: Connection into Conservation Halton's and Credit Valley Conservation's system that will allow for the Town and the conservation authorities to seamlessly share files, comments, and progress on property development applications.

Benefits: Integrations to improve processing and provide insights into status of applications.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Connection to Federal Authorities

Description: Identify and establish connections with key federal authorities and agencies including the Department of Fisheries and Oceans and Canada Post to share information, comments, and progress on property development applications

Benefits: Integrations to improve processing and provide insights into status of applications.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

The One Window Dashboard

Description: Building off of the *Oakville Platform* in Program One, the connections to Halton Region, conservation authorities, the Province and others will be incorporated into the Oakville Platform to provide applicants and staff a true One Window dashboard into property development applications. The requirements for external groups would be highlighted to the applicant then gathered during the initial submission. The system would then notify the external agencies of the application and allow them to access the documents. All approvals will come to the applicant via the One Window Oakville platform. The status of applications and any comments can also be viewed by the applicant to inform them of where there are issues.

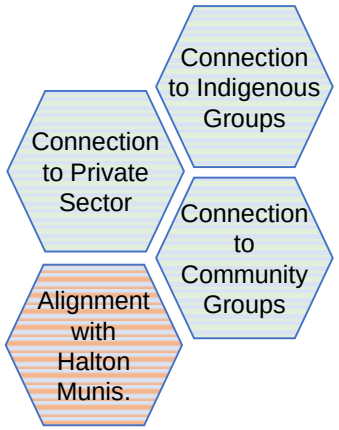
Benefits: Better informed applicants, more upfront information to make the complete property development process more efficient, better collaboration and communication with external stakeholders, improved transparency, and lower costs.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Program Two – One Window Solution

Activity Information

Activities and Actions



People | Technology | Process | Data

Connection to Indigenous Groups

Description: Ensuring that local indigenous groups have the access to the information they require to be fully informed about projects under Duty to Consult legislation.

Benefits: Early engagement to identify any potential issues that may arise from the project and enhanced collaboration with indigenous groups to ensure their perspectives are accounted for throughout the development approval process.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Connection to Community Groups

Description: Identifying the needs of various community groups (e.g., residents association, Oakville Green, Business Improvement Areas) and allowing for access to their desired information.

Benefits: Improved input from the community resulting in more informed stakeholders and earlier identification of potential issues.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Alignment with Halton Municipalities

Description: Alignment with Burlington, Milton, and Halton Hills to unify information exchange across the region.

Benefits: Streamlining processes across the region will allow for easier integrations with key regional stakeholders include the region itself, conservation authorities, provincial ministries, and others.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Connection to Private Sector

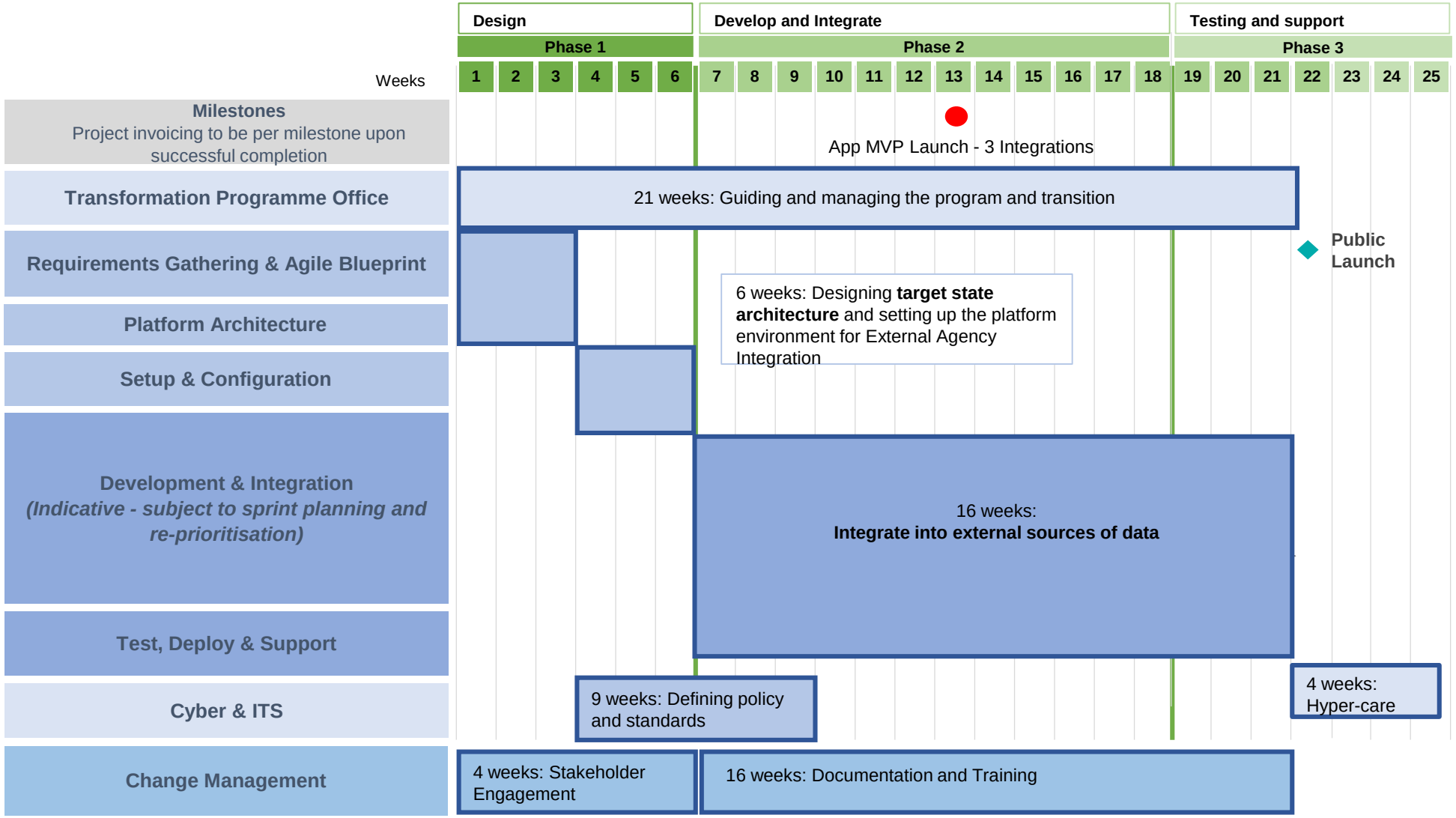
Description: Connecting with various private sector groups involved in the property development process including railways, telecom providers, and utilities providers.

Benefits: Improved communication between all groups to ensure that applications are brought to the relevant agencies in a timely manner to quickly identify and resolve potential issues.

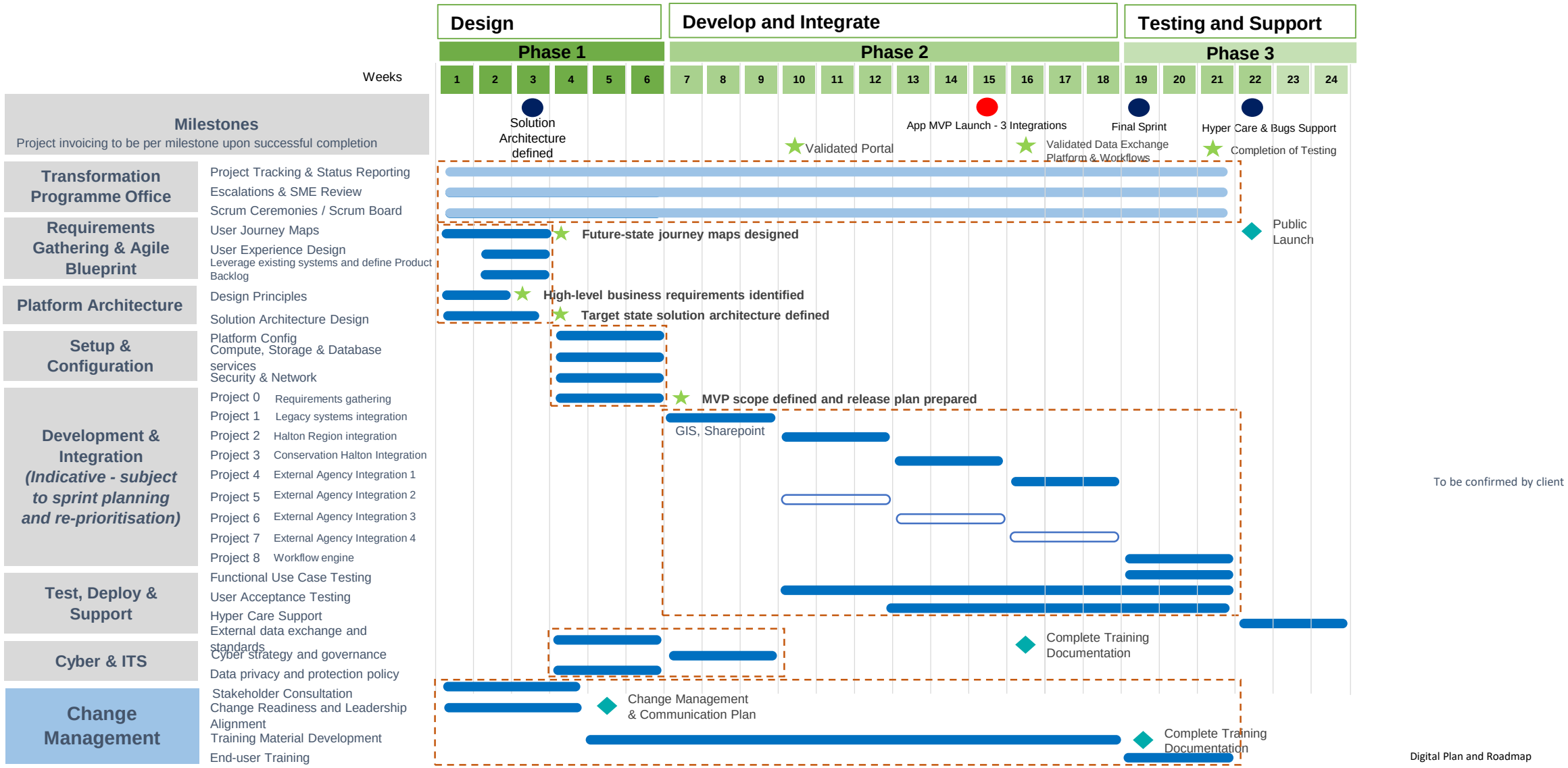
Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Typical Timeline| Program Two: One Window Solution

The proposed project timeline spans 25 weeks (6 Months) and aims to deliver a MVP digital portal platform based on Cloud Architecture that will provide Town of Oakville the foundational and scalable capability required to unlock value in the future. Hybrid-agile process will allow for reconfiguration and realignment during delivery.



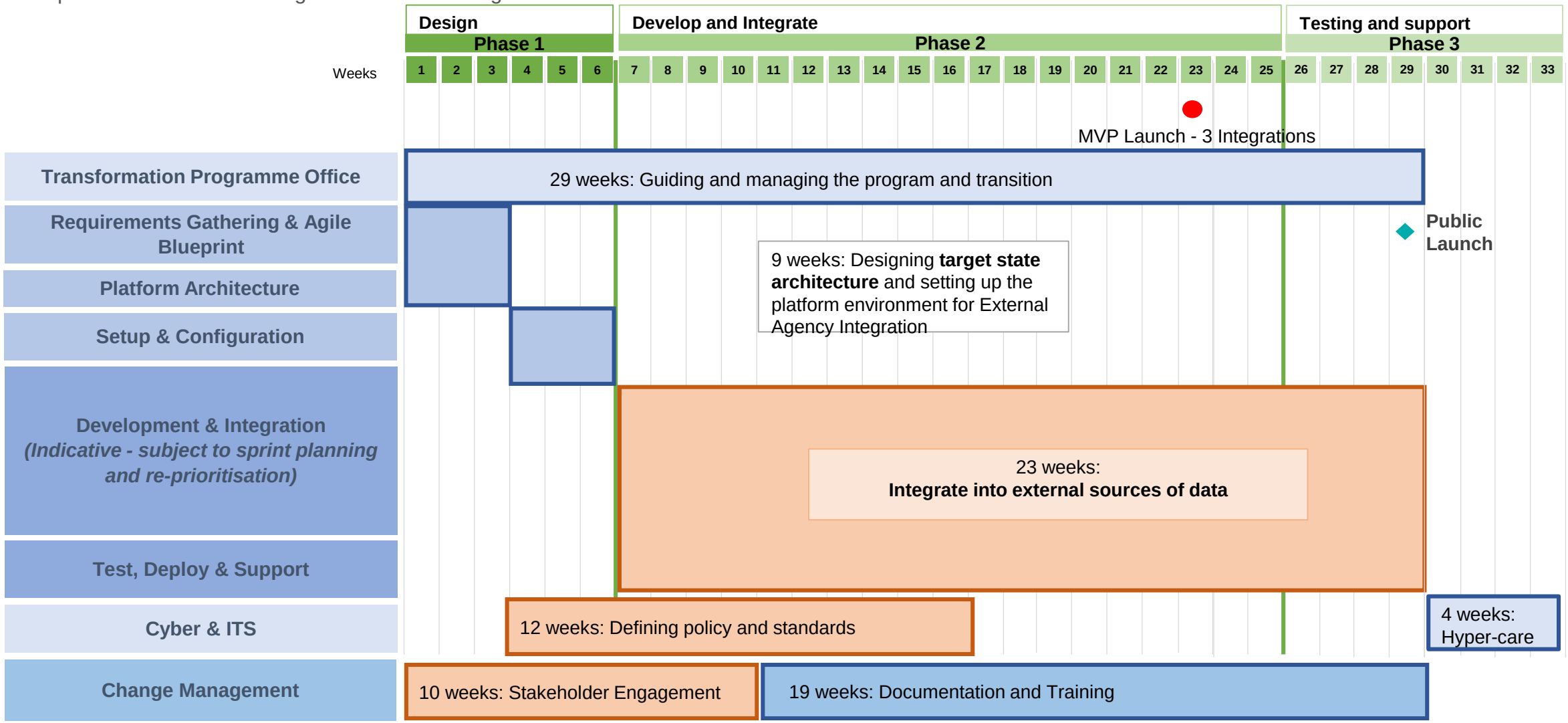
Detailed Timeline (Typical)| Program Two: One Window Solution



To be confirmed by client

Extended Timeline| Program Two: One Window Solution

The proposed extended project timeline spans 33 weeks (8 Months) and caters for up to 50% additional time required for external stakeholder engagement and access to data points that are not under governance or management of Town of Oakville.



Program Two – Alignment with Goals

Program Two works to resolve the challenges that Oakville faces when dealing with external agencies.

GOAL 1 :
Develop or adopt standards for application submissions to streamline integrations and facilitate data processing automation

Objectives

- **Submission stage gate**: Establishing the minimum quality expectation for receipt of new development applications should elevate the integrity of 'data in'.
- **Prioritization**: defining a workflow and project KPIs should assist in up-front prioritization of submission, based on internal capacity, project size and complexity, and strategic importance.
- **Format**: Create a minimum requirement for CAD and Building Information Modelling (BIM) format submissions by defining the minimum threshold for Level of Development (LOD) should improve the case for automation, data sharing, and accuracy of work.
- **Integration**: Establishing the data standard that enables ease of project data integration into a common data environment (repository)
- **Centralization**: Configuring internal workflows to support a centralizing and channelling flow of information should improve transparency and tracking of process and accountability.

GOAL Alignment
Program Two continues work done by Program One and extends the scope to include external agencies – information exchange will now be standardized through a single application and seamless across agencies.

Objective Alignment

- **Submission stage gate**: Program Two includes evolving Program One's submission standards to include the requirements of external agencies.
- **Format**: The proposed development of standards under Program One will evolve under Program Two to include external requirements allowing for the seamless flow of information between the Town and external agencies.
- **Integration**: Program Two focuses on integrating the Town with external agencies – this is done through the development of standards and through digital connections to allow application information to automatically flow from one organization to another.
- **Centralization**: The single source of truth developed for Oakville in Program One is expanded to include others involved in the property development process, creating a truly centralized system.

Program Two – Benefits

Program Two brings together the many stakeholders of the Property Development process into one centralized location.

How does Program 2 help?

- By having one common portal, applicants no longer have to submit their documents and drawings to various agencies – everything is in one place and all the requirements are captured.
- Internally, the one-window solution allows Town staff to have insight into the progress of external staff. This reduces the amount of time Town staff have to spend tracking down external staff for updates and ensures that the appropriate staff are contacted.
- The one-window approach consolidates comments from all agencies to allow Town staff and applicant better visibility into the comments that other agencies have regarding the applications.
- Leading jurisdictions that implemented similar initiatives have shown substantial improvements in processing time and better collaboration between stakeholders

Program Three – Model Based Developments

Program Three – Model Based Developments

Charter

Description

Program 3 of Oakville's Digital Plan will revolve around the Town adopting Building Information Modelling (BIM) to further enhance the Town's property development processes.

BIM has the potential to radically change how property development processes are conducted, allowing for a more collaborative environment while also providing significant amounts of additional information to aid in the review of applications allowing for the automation of some reviews and the opportunity for new ways of doing business.

BIM adoption is a necessary component for digital twins and Program Four.

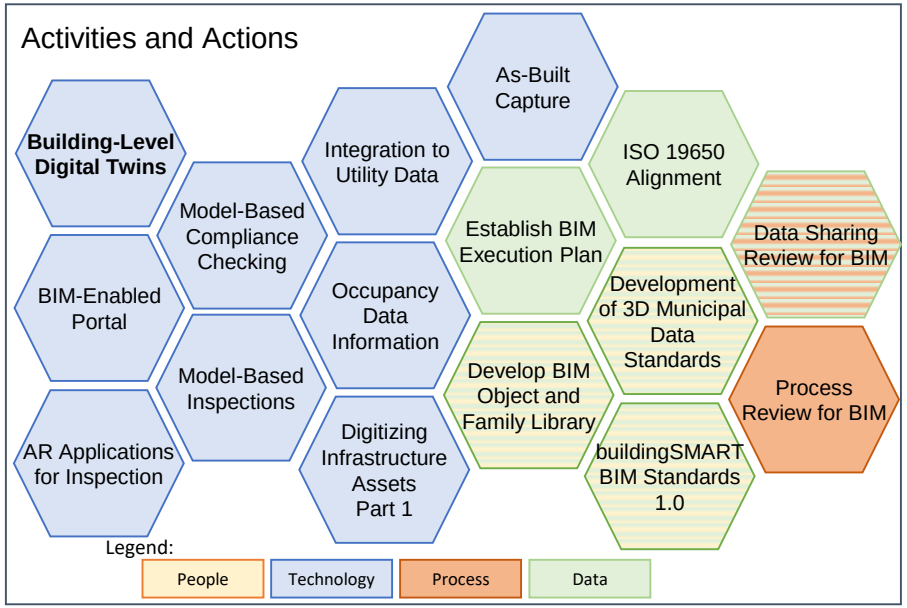
Goals

- Harness the information embedded in BIM files from intake to inspection for property development applications.
- Adopt a series of standards to guide applicants and staff alike to promote consistent, quality submissions and to enable opportunities for automated review and easier integration with digital twins in future.

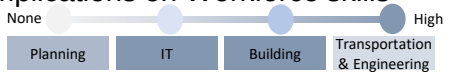
Objectives

- Adopt BIM standards, guides, and documentation that will ensure consistency between submissions and allow for the automation of low-value/high-effort reviews throughout the property development process.
- Acquire the technology required to intake and review BIM files for property development services and automated portions of the review process.
- Investigate and acquire the technology required to implement BIM-based inspection capabilities.
- Capture relevant data to enable the development of building-level asset management and digital twins.

Activities and Actions



Implications on Workforce skills



Skills	Execution	Sustainment	Collaboration
Navigating 3D Environments			X
BIM Collaboration/Cloud Knowledge	X	X	
BIM Level of Development	X		X
GIS	X	X	X
BIM Standards/Documents	X	X	X
Smart Building Performance Metrics	X	X	
IOT Applications	X	X	
Augmented and Virtual Reality	X		X
Automated Code Compliance	X	X	X

Technology Considerations

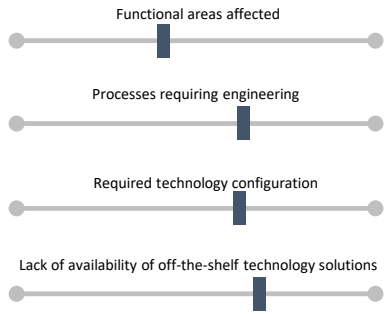
Current:

- Submission of 2D drawings often requires flattening of models already built in 3D BIM environment.

Future:

- The Town having the capability to accept BIM digital assets that are created by designers and to utilize them as foundational blocks towards the City Information Model in Program Four.
- Building-level data analytics to be used by the Town.

Complexity



Benefits Realization (Impact)

Legend: Impacted

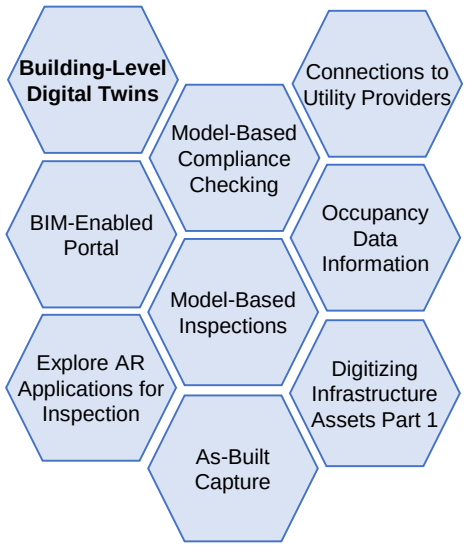
Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

- BIM fundamentally improves collaboration between all parties, allowing all stakeholders to view and comment on a 3D model, combined with embedded communication tools.
- The immense information provided in a BIM file will allow for more thorough analysis and ultimately improve operating efficiency as the analysis of that information – if standardized – can be automated for certain reviews and will lead to a better understanding of how applications comply with Town requirements.
- Customer experience will be enhanced through the creation of standards that will aid applicants in developing BIM models, thus utilizing the investments already made on BIM by the applicants.

Program Three – Model Based Developments

Activity Information – Technology

Activities and Actions



BIM-Enabled Portal

Description: Upgrading the *Smart Portal* in Program One to allow for the acceptance of BIM files and automated model validation to ensure it meets the standards set out by the Town prior to official intake.

Benefits: Intake of BIM models to allow for enhanced visualization and automation/analysis opportunities.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Model-Based Compliance Checking

Description: Acquiring the technology for the automatic and assisted review of various clauses, by-laws, and other requirements needed throughout the property development process. This would also involved determining the various types of analysis the model will undergo during the review and associated software compatibilities.

Benefits: Automation of low-value/high effort tasks that will result in time savings for the Town.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Integration to Utility Data

Description: Connecting building level usage for water, sewage, electricity, and gas to track building performance metrics to track actual performance to planned performance.

Benefits: Ability to monitor usage to use in further analysis and track performance against sustainability goals and policies.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Model-Based Inspections

Description: Using the as-designed model to compare with the as-built building during the inspection to ensure that the constructed building, including both the sub- and super-structure, matches the design and meets the requirements set out by the Town and the Building Code.

Benefits: More accurate reviews, opportunities for collaboration internally and with applicants.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

AR Applications for Inspection

Description: Building off the Model-Based Inspections activity, this activity will bring BIM to the work site and allow inspectors to use augmented reality to augment the as-designed model to the construction to verify compliance.

Benefits: More accurate reviews, opportunities for collaboration.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Occupancy Data Information Integration

Description: Capturing data from building level sensors Town-owned assets and tracking the utilization of their assets, including libraries, community centres, etc.

Benefits: Improved asset and facilities management, improved ability to analysis buildings prior to approvals.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Digitizing Infrastructure Assets Part 1

Description: Capturing and digitization of existing Town infrastructure assets – including sewers, water lines, roads, and bridges – in BIM. Part 1 focuses on capturing assets that specifically connect to buildings and would aid in the review of applications.

Benefits: Allows the Town to digitally document and model all existing infrastructure assets that connect to proposed developments to aid in the review of approvals.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

As-Built Model Capture

Description: Capturing the final, as-built building through updating the BIM model, 3D scanning, or other means to document the completed building and enable the analysis and use of the project in future Digital Plan activities.

Benefits: Capturing the built asset allows it to be inputted into a city information model in Program Four, and sets a baseline for future alterations to the building should there be further property development applications made for the property.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Building-Level Digital Twins

Description: Acquisition of software that will allow the Town to analyze BIM models as building-level digital twins throughout the property development process to aid staff in evaluating the performance and function of the building and it's compliance with applicable codes, regulations, and standards.

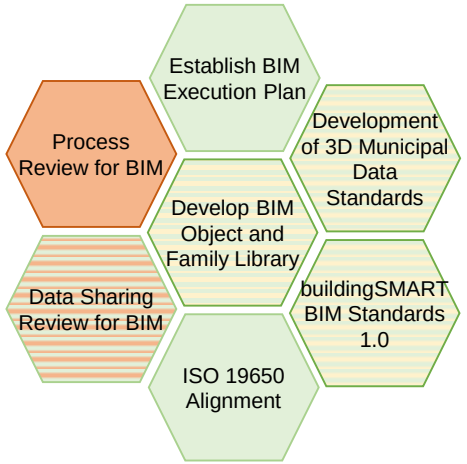
Benefits: Digital Twins offer the ability to test scenarios around BIM models and files to assist in project retrofits, rezoning, or redevelopment applications. There are also opportunities to enhance collaboration internally and with applicants during the review phase with improved visualization and the potential for applicants to show compliance with requirements.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Program Three – Model Based Developments

Activity Information – Data and Processes

Activities and Actions



People | Technology | Process | Data

buildingSMART BIM Standards 1.0

Description: Alignment and collaboration with buildingSMART Canada in developing and/or adopting BIM standards for municipal submissions for property development approvals that will be provided to applicants.

Benefits: Adopting BIM standards will allow applicants to submit quality, consistent submissions.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

ISO 19650 Alignment

Description: Review and align Oakville's BIM standards and internal processes with ISO 19650 on Building Information Modelling.

Benefits: Alignment with industry-recognized in handling information modelling, that are already accessible to applicants.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Data Sharing Review for BIM

Description: With BIM models in hand, the Town will have access to substantial amounts of data that they will be able to share with various stakeholders throughout the property development process. It is imperative that data sharing protocol be review to identified what information can be shared with other agencies, community groups, and residents.

Benefits: Exploring opportunities to share data can allow for additional perspectives to be account for improve communication.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Establish BIM Execution Plan

Description: In coordination with the developed standards, adopt a BIM Execution Plan (BEP) that will be used to guide the Town and applicants in the expectations for BIM submission.

Benefits: More consistent submissions, more informed applicants, standardized inputs allow for consistency and automation in processing.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Develop BIM Object and Family Library

Description: Establish BIM libraries of families and objects to provide to applicants that will meet the standards adopted by the Town.

Benefits: Standardized BIM inputs to allow for automated and easier reviews, allow for opportunities for the Town to generate revenue in selling BIM libraries to applicants.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Development of 3D Municipal Data Standards

Description: Creation of templates, standards, and guidelines to aid applicants in creating models and ensuring their models are compliant with the Town's requirements and able to be analyzed as outlined in the to-be-developed model-based compliance activity.

Benefits: More consistent submissions, more informed applicants, standardized inputs allow for consistency and automation in processing.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Process Review for BIM

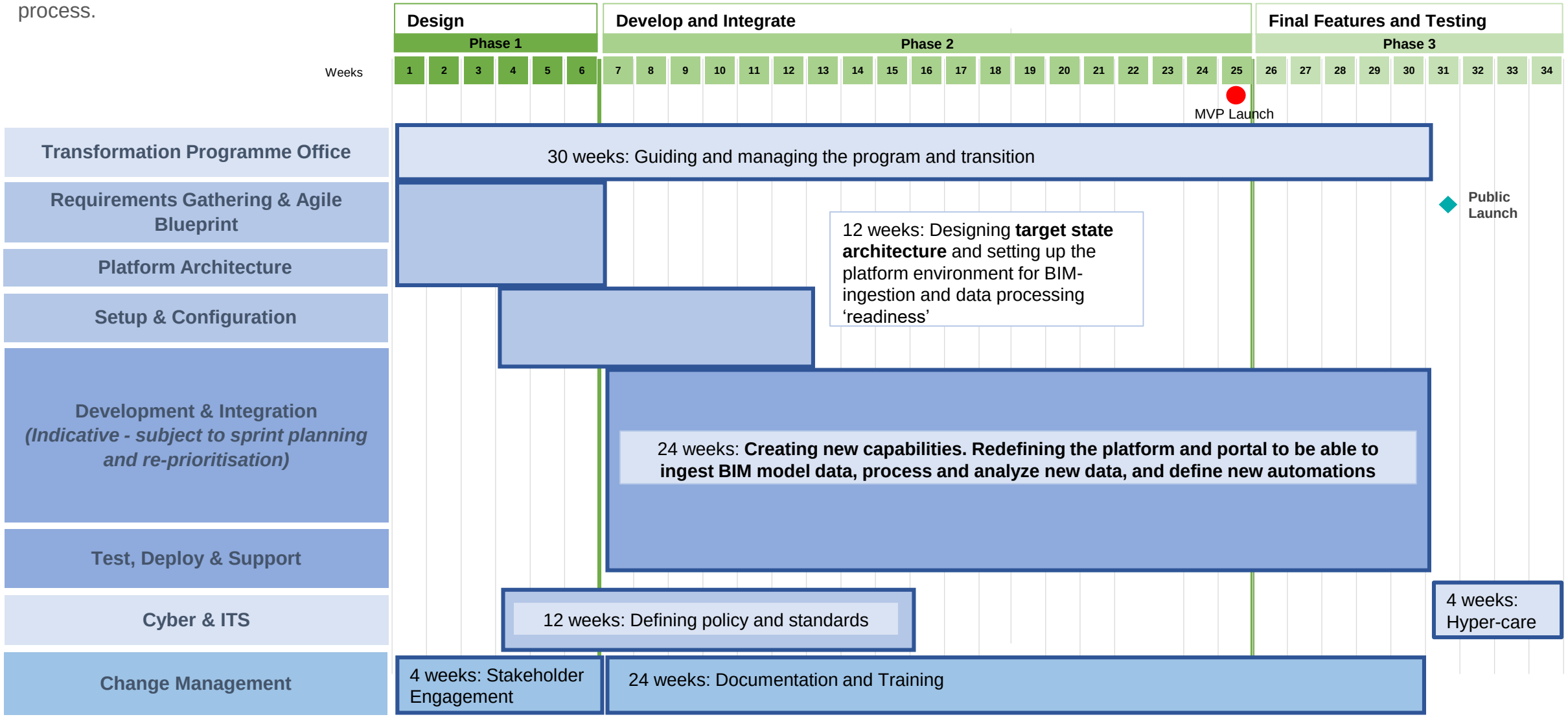
Description: Establish processes for compliance checking automation, increase efficiencies, with BIM collaboration between planning, engineering, building and other departments. This should also include a review and resolution of potential legal issues surrounding the use of BIM as well as a review to ensure compliance with various legislation, including the Building Code Act and Planning Act.

Benefits: BIM adoption can reduce time spend on low-value/high effort tasks through automation and improve internal collaboration. Automate and validate BIM model data quality and compliance against building code.

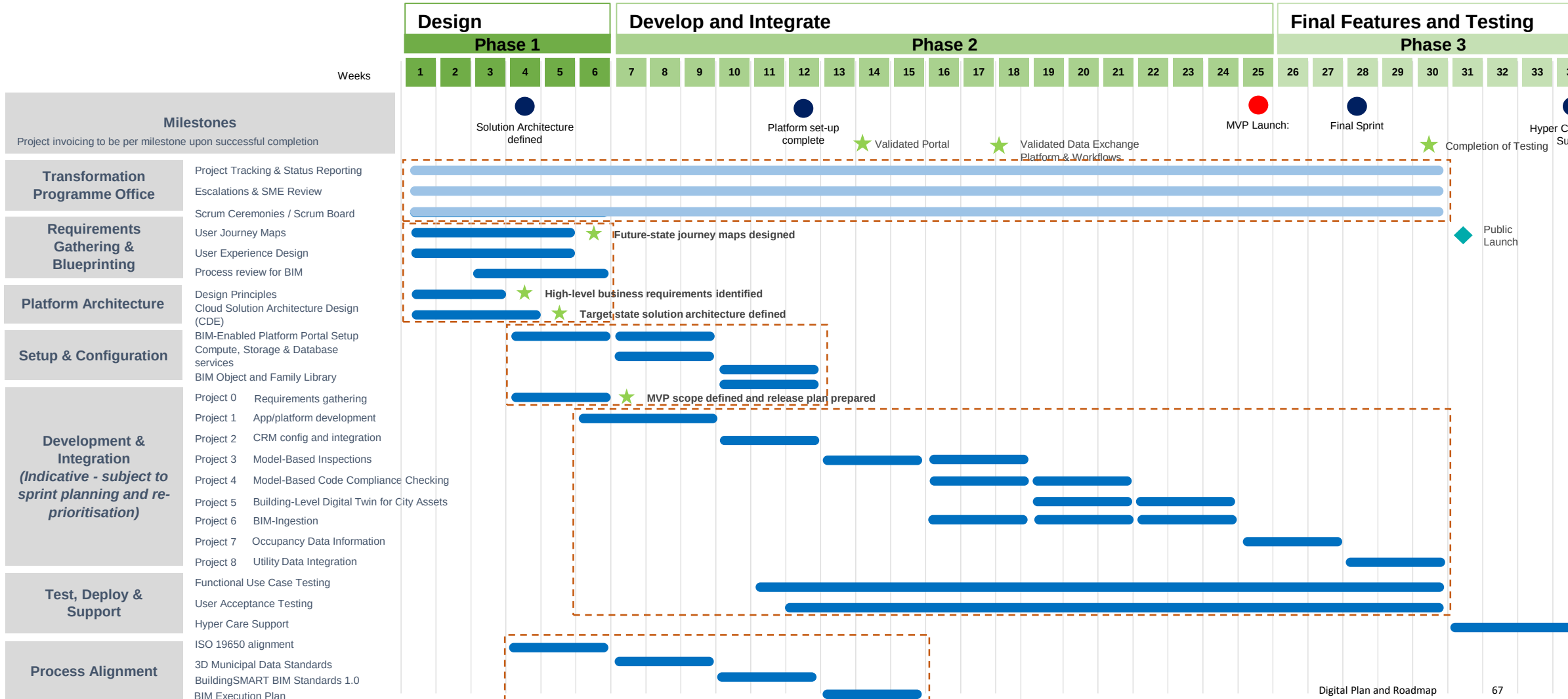
Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Typical Timeline| Program Three: Model Based Approvals

The proposed project timeline spans 34 weeks (8 Months) and aims to deliver an MVP and digital portal platform based on Cloud Architecture that will provide Town of Oakville the foundational and scalable capability required to unlock value in the future. Hybrid-Agile process will allow for reconfiguration and realignment during process.

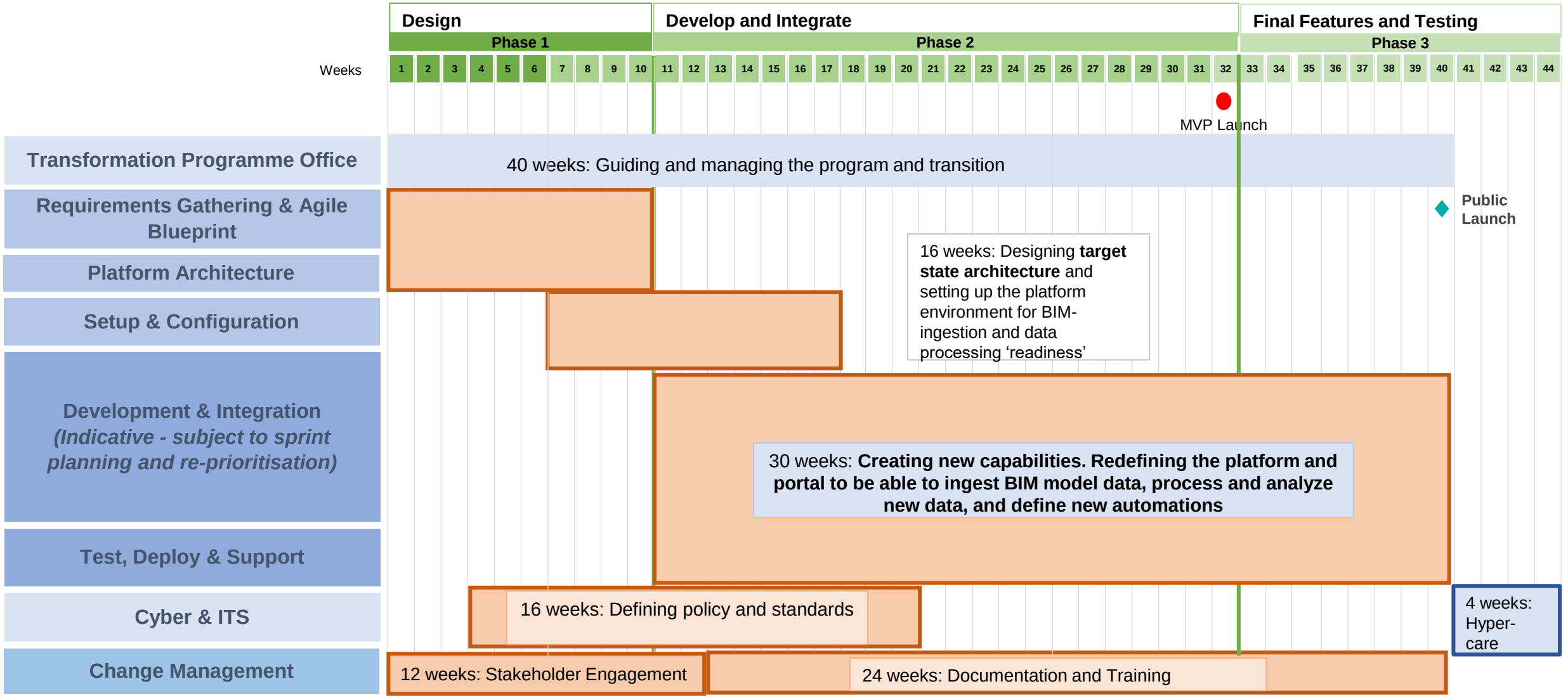


Detailed Timeline (Typical)| Program Three: Model Based Approvals



Extended Timeline | Program Three: Model Based Approvals

The extended proposed project timeline spans 44 weeks (11 Months) caters for up to 50% additional time in workstreams where stakeholder engagement, co-design and UAT with Oakville, and custom development are required.



Program Three – Alignment with Goals

Program Three introduces BIM to create further efficiencies and opportunities for the Property Development Service

GOAL 2:
Digitally reimagine and enable the property development process

Objectives

- **Customer First Culture**: To be digital, the culture within Oakville must be that you deliver customer needs; features that are beneficial to the development approval process or quick turnaround or low cost.
- **Instant Feedback**: in a digital world, Oakville workforce and customers should expect instant feedback to their requests.
- **Real-time**: a digital platform should expect to receive requests 24 hours a day, every day. It should be available on demand. And the data it uses/returns should be the latest. Eventual consistency is a valid architectural approach, but this should be measured by network and automated processing latency and not business process latency.
- **Automated**: a digital service should include as much computer processing as possible without the need for manual intervention.
- **Intelligent**: your digital services should do all the heavy lifting. Oakville services should be able to handle the rawest bit of information from the customer and ubiquitously calculate, amalgamate, massage and convert it.
- **Online**: a digital service should be accessible anywhere with an internet connection, with no limitation on device and usage.
- **Ease of use**: Bring what is most important to the workforce and the customer to the forefront.
- **Regular scalability and improvements**: A digital platform should be improving itself as often as necessary.

GOAL Alignment:
The adoption of BIM ensures a digital reimaging and enabling of the property development process through the transition from 2D to a 3D, information-rich model-based environment.

Objective Alignment

- **Customer First Culture**: BIM encourages collaboration between all stakeholders – it is a cornerstone of the BIM process. This collaboration will offer applicants new opportunities to interact with the Town and ensure that their submissions are efficiently reviewed.
- **Instant Feedback, Real-time:** BIM collaboration allows for stakeholders to communicate in real-time – once a model is uploaded, the applicant, Town staff, and external reviewers can comment on the model, sees what others are commenting, and work together to identify potential issues and resolve challenges.
- **Automated**: BIM enables automation – whether it is a pre-check of a file to ensure it is compliant with the Town's standards or if it is checking for compliance with the building code or planning regulation, the level of information in a BIM model will allow for tedious tasks to be automated.
- **Intelligent**: With BIM and automation, it is possible for issues to automatically be flagged throughout the review process and communicated to staff and the applicant.
- **Online**: Program 3 is strictly online – all comments are stored in one place with no paper submissions required.
- **Ease of use**: The collaborative platform allows for a transparency into the process – while the initial transition to BIM may be challenging, once one is familiar with BIM processes are easy to follow and repeatable.
- **Regular scalability and improvements**: BIM is evolving, and Program 3 encourages a flexible approach to ensure these advancements are captured post implementation.

Program Three – Benefits

The introduction of Building Information Modelling in Program 3 in property development offers many new opportunities to do current tasks more effectively.

How does Program 3 help?

All Property Development Services Departments

- Collaborative review platform with applicants to allow the applicant to show how their design demonstrates compliance with planning regulations, codes, and standards.
- Comment and issue tracking built into the BIM review tool.
- Consistent, higher quality submissions from applicants with the aid of standards/protocol/specification.

Building Services

- Model-based compliance checking capabilities to allow plan reviewers to spend less time checking mundane, tedious code clauses and spend more time reviewing key issues.
- Augmented and virtual reality opportunities to allow for more enhanced inspections capabilities, including the ability to mark-up the model on-site and document any deficiencies while effectively relaying this information to the builder.
- 3D capture to allow for the updating of BIM models as construction progresses, including a capture of the as-built building, which can be used for inspection and various other business uses.

Planning

- Improved visualization for all parties to give planners, municipal officials, and residents alike a better understanding of the project, how it is going to look, and how it will impact the immediate area.

Engineering

- Model-based checks to review and analysis key engineering features, including grading.
- Enhanced inspection opportunities using BIM and augmented/virtual reality to review key infrastructure and document deficiencies.
- Digitization of infrastructure assets to aid in the analysis of development approvals as well as maintenance.

Asset Management

- Ability to create building-level digital twins of municipal buildings through the capture of as-built building in BIM for use in many areas including:
  - Facilities management and occupancy data information
  - Integrations with utility data to track energy and water consumption
  - Tracking of asset information for maintenance and replacement

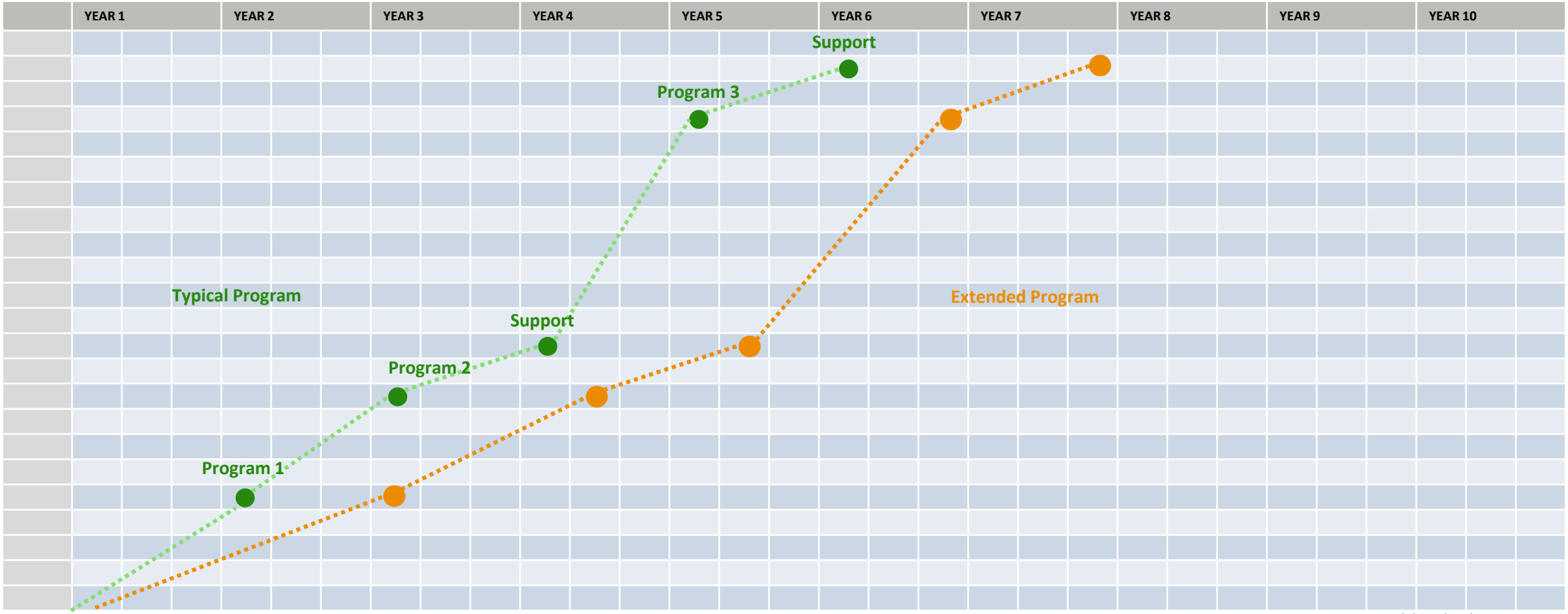
Fire

- Model-based compliance checking capabilities to allow plan reviewers to spend less time checking mundane, tedious code clauses and spend more time reviewing key issues.
- As-built capture of the final building to document in the event an emergency response is required.

Program One Through Three Overview

Combined Program: 3 Programs to fully functional BIM-enabled Platform

The following represents a typical expression of effort and cost in platform design, implementation and support, comprised of three (3) Programs over the next five (5) years, taking into consideration time to completion, duration between program delivery for ongoing support, and time between programs for procurement to enable next phase. Program 4 CIM is intended to initiate post 5 year development roadmap and subject to future solution design and reconsideration of commercially available and viable technology opportunities to support the program as delineated in this report.



Program Four – City Information Modelling

Program Four – City Information Modelling

Charter

Description

Program 4 puts Oakville at the leading-edge of municipal technology, both nationally and globally, by creating City Information Models (CIM) that will allow the Town conduct business with transformational tools and immense data opportunities.

This program involves developing city information models of the Town by capturing relevant information upon submission and digitizing infrastructure assets, integrating GIS and other data, aligning with and adopting various standards, and exploring opportunities to harness the technology and data created to improve the property development process.

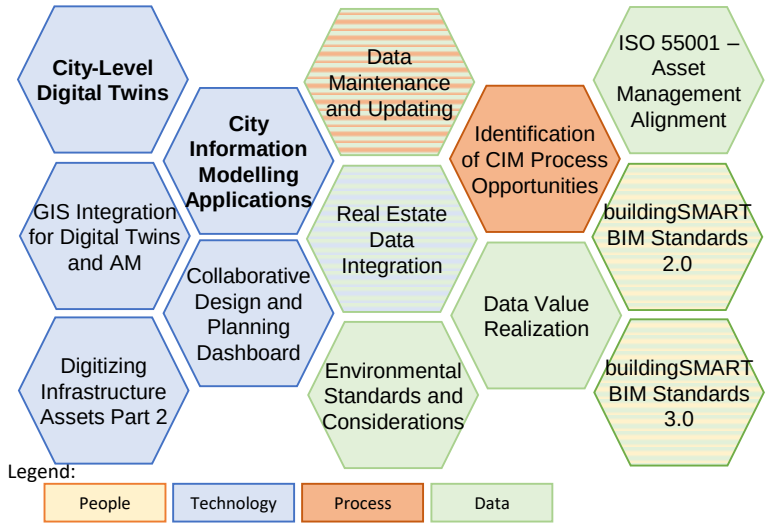
Goals

- Combining BIM and GIS data to create city information models.
- With the CIM in hand, leverage the model for a variety of meaningful applications – from asset management to emergency planning – that can enhance property development processes and other business areas at the Town.

Objectives

- Adopt standards that would allow the Town to integrate BIM data, GIS data, and other data to create and populate a City Information Model.
- Adopt and update standards that would allow the Town to receive submissions from applicants to ensure they are capable of being integrated with the City Information Model.
- Identify and implement City Information Modelling opportunities for applications both within and outside the property development process that will create additional value to the Town, applicant, and other stakeholders including Asset Management, Emergency Planning, and Municipal Operations.

Activities and Actions



Implications on Workforce skills

None — High

Planning | IT | Building | Transportation & Engineering

Skills	Execution	Sustainment	Collaboration
Navigating 3D Environments			X
GIS	X	X	X
CIM Standards/Documents	X	X	X
Intelligent City Asset Management / Metrics	X	X	X
IOT Applications	X	X	
Digital Twin	X	X	X
Scenario Planning and Option Analysis			X
Information Technology Infrastructure Library (ITIL)	X	X	

Technology Considerations

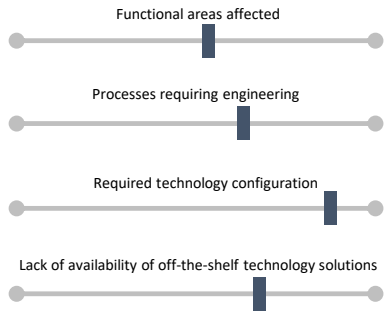
Current:

- Town currently has ArcGIS Urban to model certain buildings, projects, and concepts, but models are generally contain low levels of detail.

Future:

- The Town will have the technology in place to place as-design and/or as-built BIM models on a GIS platform to conduct analysis and run simulation on a city-wide scale.

Complexity



Benefits Realization (Impact)

Legend: Impacted

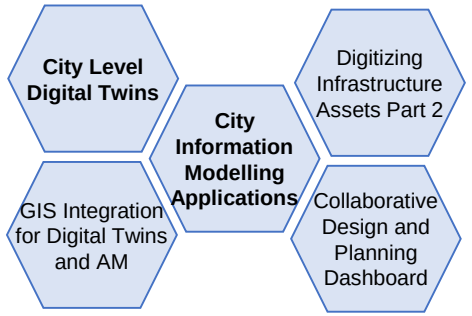
Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

- Provides new opportunities for collaboration between applicants and Town staff in designing and reviewing property development applications to ensure that Town requirements are being met and identify ways to improve design.
- Allows the Town to review new type of information, including simulation and scenario-testing, during the property development application review phase to analysis applications in new, meaningful way.
- Provides the basis for many opportunities outside the property development space, including asset management, emergency planning, and municipal operations.

Program Four – City Information Modelling

Activity Information - Technology

Activities and Actions



People | Technology | Process | Data

GIS Integration for Digital Twins and AM

Description: Integration of GIS and BIM to allow for BIM models to be precisely placed on a map to allow for the creation of city-level digital twins with as-designed or as-built BIM models.

Benefits: Enables city-level digital twins, allows for the accurate analysis of BIM models in accurate geo-spatial conditions in turn unlocking new analysis opportunities.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Collaborative Design and Planning Dashboard

Description: Building off the BIM-Enabled Portal, this activity will allow Town staff to use CIM to review projects in collaboration with applicants both prior to and after a formal application has been made to maximize the benefit of the project using CIM information, generative design based on Town planning and zoning requirements, and AR/VR.

Benefits: Improved collaboration between Town and applicants, improved visualization, co-creation opportunities.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

City-Level Digital Twins

Description: A populated City Information Model – created through the integration of BIM, GIS, and existing infrastructure information.

Benefits: Improved visualization, opportunities for collaboration with staff, applicants, and public, improved information during property development process, various applications outside of the property development ecosystem.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Digitizing Infrastructure Assets Part 2

Description: Capturing and digitization of existing Town infrastructure assets – including sewers, water lines, roads, and bridges – in BIM. Part 2 focuses on capturing Town assets not captured in Part 1 to continue building the CIM with all the information relevant to property development.

Benefits: Allows the Town to digitally document and model all existing infrastructure assets to allow for integration with City Information model.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

City Information Modelling Applications

Description: A variety of applications that can enhance how things are being done, both in the property development ecosystem and in other Town business areas,

Benefits: CIM has the potentially to benefit many business areas across the Town, including:

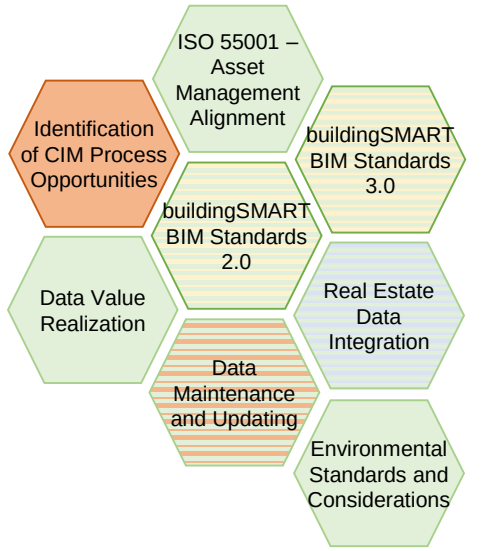
- Enhanced Policy and Council Decisions – including the ability to present and assess models instead of reports to the public and councillors..
- City and Land Use Planning – including the ability to use generative design to model the best use of land given current or future zoning requirements and land value.
- City-Level Data Analytics – including the capture and analysis of information to allow for more informed decisions regarding property development approvals.
- Asset Management – including taking asset information during the property development phase and using that information in the management of assumed Town assets.
- Municipal Operations – including the identification of traffic infrastructure, transit, and cyclist needs through modelling.
- Emergency Planning – including creating scenarios for disaster testing.
- Fire and Emergency Response – including modelling the use and distribution of emergency vehicles.
- Smart City Capabilities – including the capture and analysis of facility information, road usage, and other dynamic information to respond to live conditions.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Program Four – City Information Modelling

Activity Information – Data and Process

Activities and Actions



Identification of CIM Process Opportunities

Description: CIM offers many possibilities; this activity investigates the opportunities that are most relevant to the Town and to the property development process to identify which applications can be incorporate into Town requirements and processes while complying with the relevant legislation.

Benefits: Opportunities to harness CIM to introduce new requirements and processes to enhance the property development process and/or create new efficiencies.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

buildingSMART BIM Standards 2.0

Description: Adopt updated BIM Standards, in partnership with industry and standards development organizations, to ensure that property development applications that are submitted to the Town are capture all required information and are capable of integrating with the CIM.

Benefits: Consistent and standardized submissions to encourage high quality applications and allow for seamless integration with BIM tools and the City Information Model.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

ISO 55001 – Asset Management Alignment

Description: Adoption of ISO 55001 standards for asset management to aid the Town in managing the lifecycle of its assets and the intersection of Asset Management, GIS, and BIM.

Benefits: Alignment with international asset management standards to bring best practices to Oakville and ensure efficiency in requiring information for asset management be captured throughout the property development process.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Real Estate Data Integration

Description: Obtaining and integrating real estate data for the Town to input into the City Information Model and incorporate this information into property development processes and decisions.

Benefits: Aid applicants and Town staff in determining the financial implications of projects and identify the best options that maximize value for the Town and applicant alike.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

buildingSMART BIM Standards 3.0

Description: Continued adoption and updating of BIM Standards, in partnership with industry and standards development organizations, to ensure Town requirements are captured and submissions can be integrated with Town's CIM as the Town's capabilities and requirements evolve.

Benefits: Continued consistent and standardized submissions to encourage high quality applications and allow for seamless integration with BIM tools and the City Information Model.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Data Value Realization

Description: Understanding the potential data that the Town can capture, analysis, use, and share throughout the property development process, other Oakville processes, and with the public to allow all groups to make more informed decisions.

Benefits: Unlocks new opportunities for data, which in turn can improve process efficiency and internal collaboration while offering an opportunity to generate revenue based on this analysis.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Data Maintenance and Updating

Description: Develop a strategy to maintain and update data to ensure that the CIM contains reliable, usable data in the future as the model continues to expand to incorporate new uses.

Benefits: Ensuring updated, accurate input data is critical to ensuring accurate results – developing this maintenance and updating strategy is a key consideration to ensuring the model can be used for years to come.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Environmental Standards and Considerations

Description: Identify and incorporating various environmental standards, legislation, and information into the Town's CIM, including information on the Town's canopy and energy usage.

Benefits: Incorporating environmental information will allow for the Town to better understand a projects impact on the local community and allow for opportunities to incentivize 'green' projects.

Customer Experience | Operational Efficiency | Enhance Internal Collaboration | External Agency Integration

Program Four – City Information Modelling

Program Four – City Information Modelling – falls largely outside of the five-year detailed plan.

It is expected that Programs One through Three will take approximately five years to implement, at which point the Town will be more prepared to introduce CIM into its property development process as it will have all the tools in place that are required to begin that transition.

Additionally, technology and opportunities in this space are rapidly evolving – the opportunities that exist today will likely change, and new opportunities will also arise as the sector advances. One of the main activities of Program Four is to identify the CIM opportunities that are going to be relevant at the Town – this is a key step to ensure that the opportunities that exist at the time the Town is ready to adopt CIM can be successfully incorporated into the property development process.

Program Four – Alignment with Goals

Program Four involves the integration of BIM and GIS to create City Information Models – CIM – to unlock new potential in the property development space.

GOAL 3 :
Leverage the full value of data to proactively guide the quality and appropriateness of new development applications

Objectives

- **Leverage the power of AI:** Harnessing machine learning can be transformational, but for it to be successful, Oakville needs leadership from the top. This means understanding that when machine learning changes one part of the process then other parts must also change. This can include everything from submission scrutiny and approval, to issuing real-time feedback, and even hiring and incentive systems.
- **Data Analytics:** Having data is not enough, it's what we do with it that matters. While this process can certainly be automated, empowering the Oakville workforce to leverage analytics in workflow as well as the performance management will be critical. Oakville should develop the skills become more capable in descriptive analytics, diagnostic analytics, predictive analytics, and prescriptive analytics.
- **Real time master planning:** Zoning can often lead to time and delay in new developments. By leveraging project and contextual data, zoning can become an enabler of new developments, adapt to changes based on data and evidence, and support community-buy in.
- **Incentivize:** Understanding what a new development has the capacity to become, brings the opportunity to incentivize customers to do better for shared value.
- **Continuous updates:** understand that the market is ever-evolving. Provide ongoing insights to projects that are completed to support their sustainability and modernization roadmap.

GOAL Alignment
CIM is all about integrating data – first integrating BIM and GIS information to develop the CIM, and then integrating other data – and even real-time data – to allow for in-depth analysis and simulation using digital twins.

Objective Alignment

- **Leverage the power of AI:** AI can be utilized throughout the implementation of the digital plan – there are opportunities to investigate how AI can aid reviewers in their review as well as aid applicants throughout the submission process. By Program 4, enough data should be available to Town to truly harness AI capabilities.
- **Data Analytics:** Program 4 seeks to analyze and streamline the reporting of the information capture through prior programs into one collaborative dashboard that will allow all stakeholders to view project data and information and allow the Town to determine where process improvements can be made.
- **Real time master planning:** Program 4 includes provisions for planning applications in CIM, such as generative design and real time master planning.
- **Incentivize:** CIM allows its users to identify the best opportunities for a plot of land and then work to ensure that those opportunities are achieved through the analysis of infrastructure and location information.
- **Continuous updates:** CIM is an evolving technology. Program 4 places an emphasis on understanding and keeping up with the opportunities in the space to identify new opportunities and incorporate those into the property development process.

Program Four – Benefits

Program Four introduces City Information Modelling to the Town and unlocks numerous opportunities across many business areas.

How does Program 4 help?

All Property Development Services Departments

- Collaborative review platform with applicants to allow the applicant to show how their design demonstrates compliance with planning regulations, codes, and standards with the added geographic context provided by the GIS integration.
- Consistent, higher quality submissions from applicants with the aid of standards/protocol/specification which are updated to ensure the submissions are compatible with CIM.

Planning

- Model-based zoning and land-use checks to validate key project information upon application submission.
- Integration of information pertinent to the development approval process, including real estate data, to further inform decision making.
- Simulation capabilities to evaluate the impacts the proposed development would have on the municipality's roads, water, and utility infrastructure.
- Generative design opportunities to allow planners to maximize the benefits (as the municipality defines) or a certain lot or area.
- Emergency planning to evaluate the proposal should an evacuation or fire response be required.

Engineering

- Continued digitization of infrastructure assets to aid in the analysis of development approvals as well as maintenance.
- Integration of BIM and GIS to create a City Information Model (CIM) of the municipality to allow for many simulation opportunities, including water runoff to evaluate the capacity of the storm water system and traffic impact assessments to evaluate the effect a proposed development will have on local roads.

Asset Management

- Digitization of existing infrastructure assets and creation of city-level digital twins to allow for better analysis and monitoring of above and below ground assets.

Municipal Enforcement

- Relevant development information can be forwarded to the municipal enforcement team to ensure that by-laws and standards are being complied with. This information can be mapped, aggregated, and analyzed on a city level as desired to inform decision making.

Parks

- Digitization of park assets for better analysis and monitoring of park assets.
- Analysis of the impact of a proposal development on nearby parks, vegetation, canopy, etc.

Fire

- Simulation of fire/emergency/disaster response.

Economic Development

- Understanding the best use of land for specific plots to maximize it's potential through the creation of city-level digital twins and the integration of real estate data.

Transit/Transportation

- City-level modelling to allow for the planning and 'what-if' analysis.

Impact on the Four Pillars

Oakville's Digital Plan – Data

The Data Components of Oakville's Digital Plan is the basis of the entire property development process. Data and information is collected from the applicant, processed, circulated, and reviewed by many staff in different departments and by those in external agencies. It is crucial that data is easily managed and standardized while still maintaining it's quality and ensuring that the Town's requirements are captured.

SECURITY & PRIVACY POLICY COMPLIANT

As this system deals with personal information, the solutions developed throughout this Plan must comply with the various security, privacy, and IT policies set by the Town.

DEVELOPMENT OF TEMPLATES & GUIDES

To aid applicants in submitting quality applications to the Town, the Digital Plan calls for the development of templates and guides throughout the implementation of the Plan. This will include guides on how the process works as well as templates and BIM objects that meet the Town's requirements.

DATA EXCHANGE STANDARDS

Vast quantities of data gets exchanged between the Town, the applicant, and external agencies. The Plan calls for a standardized approach for collecting and circulating this information to ensure that all reviewers have access to the information they need to adequately complete their review.

BIM STANDARDS

To achieve the most benefit from BIM submissions, proper BIM standards are required to ensure consist, quality submissions that capture the information needed for reviews. These standards can be developed in coordination with standards development organizations, provincial groups, and industry

INDUSTRY STANDARDS

The The Digital Plan encourages the adoption and, if needed, adaptation of industry standards, including ISO 19650 for BIM and ISO 55001 for Asset Management. Similarly, the Town is encouraged to take cues from leading international jurisdictions in the property development space to shape their standards.

Legend

Program: 1. Tech and Data Foundation | 2. One Window Solution | 3. Model-Based Development Approvals | 4. City Information Modelling

Low Significance — High Significance

Oakville's Digital Plan – Technology

The Technology Components of Oakville's Digital Plan is at the heart of all four phases. The acquisition of new technology, either through developing, purchasing, or assembling, along with the repurposing and integration of existing technology are vital to the Plan's success. The recommended technologies build off of each other – the completion of earlier phases is a prerequisite for subsequent phases – though each phases brings unique opportunities for the Town, staff, applicants, and residents.

INTEGRATION WITH EXISTING SYSTEMS

Oakville already has a number of digital solutions that are used throughout the property development process. The Digital Plan aims to integrate with and make use of as many of Oakville's current technologies and systems, including AMANDA and ArcGIS

PROCESSING TOOLS & TECHNOLOGIES

The Digital Plan calls for the acquisition of a seamless, efficient system that allows for the submission of information and documents, store, circulate, and review that information, and communicate with staff, external agencies, and the applicant regarding any approvals or deficiencies.

BUILDING INFORMATION MODELLING TOOLS

Building Information Modelling (BIM) is a process that creates and manages information for built assets. The robust information stored in a BIM model can be used to aid staff in evaluating applications and can allow for the automation of low-value tasks to improve efficiency. BIM also encourages collaborative environments.

VIRTUAL & AUGMENTED REALITY

With BIM models in hand, inspectors can take the BIM model with them onsite and compare the designed building with the as-built building using virtual and augmented reality. This will allow inspectors to note changes and issues and better communicate them with the builder.

CITY INFORMATION MODELLING TOOLS

The last phase of the plan calls for City Information Modelling (CIM) and digital twins. The adoption of CIM will unlock numerous opportunities that will aid the Town in reviewing applications, collaborating with applications, and highlight the impacts the project will have to council and the public.

Legend

Program: 1. Tech and Data Foundation | 2. One Window Solution | 3. Model-Based Development Approvals | 4. City Information Modelling

Low Significance — High Significance

Oakville's Digital Plan – Process

The Process Components of Oakville's Digital Plan will enhance property development processes across all four phases. These process enhancements will come in the form of more efficiency for staff internally, with external agencies, and with applicants; introducing automation to minimize the amount of low-value/high effort tasks that must be complete; and unlock new opportunities to take advantage of the Town's future technology and data by introducing new ways of conducting review.

STREAMLINED CONSISTENT PROCESSES

Early parts of the Digital Plan focus on streamlining processes and developing a seamless process to bring property development applications from submission through to approval. This will include interactions with external agencies to ensure efficiency from an applicant perspective.

TRACKING & COMMUNICATION

The ability to track each application throughout the property development process will allow for staff and applicants to see where projects stand and reduce administrative tasks. Additional communication tools will also aid in identifying requirements, status of applications, and deficiencies.

ENCOURAGING QUALITY SUBMISSIONS

Poor quality submissions result in staff having to do more work then needed. The Digital Plan will reduce these issues through the introduction of standardized requirements, and, in latter stages, the ability to check for compliance with standards, templates, and regulations as defined by the Town and other regulation.

AUTOMATING LOW-VALUE TASKS

The introduction of model-based approvals bring significant amounts of information into an application, in turn allowing for that information to be automatically analyzed to check for compliance with zoning by-laws, the Ontario Building Code, and other regulations.

EXPLORING NEW OPPORTUNITIES

As the Town begins to develop a City Information Model the opportunity for new types of review, new ways of reviewing, and new process implications will arise. These opportunities should be explored to identify and prioritize which opportunities are most relevant to the Town.

Legend

Program: 1. Tech and Data Foundation | 2. One Window Solution | 3. Model-Based Development Approvals | 4. City Information Modelling

Low Significance — High Significance

Oakville's Digital Plan – People

The People component of Oakville's Digital Plan focuses two key areas – ensuring that the Town and its Staff are adequately prepared to adapt to significant changes in their day-to-day work brought on by digital transformation, as well as ensuring that applicants are capable of meeting the new requirements placed on them by the Town. These considerations will have to be addressed throughout the plan to ensure that everyone involved in the property development process is kept up to date on the requirements and constantly engaged.

DEVELOPING INTERNAL SKILLS

This Digital Plan will require staff that are knowledgeable about the various technologies, processes, and data within the transformed property development services. The Town will need to either internally develop these skills through training programs or hire staff that have the skills

CREATING COLLABORATIVE ENVIRONMENTS

The Digital Plan will unlock new ways for Town staff to interact and collaborate with each other. Early phases focus on streamlining communication between departments, while later phases will allow staff to effectively collaborate with all stakeholders in the property development process.

STAFF ENGENGAGEMENT

The Town will need to ensure that everyone – from the leadership team to departmental staff – is capable and supportive of the Digital Plan and resulting transformation. Feedback and ideas should be collected throughout to promote buy-in from all groups and to provide different perspectives

INDUSTRY ENGAGEMENT

To ensure that applicants are capable of meeting new requirements, formats, and processes, the Town should engagement with industry groups and applicants throughout the implementation of the Digital Plan and provide applicants with sufficient resources for support and guidance.

EMBRACING PARTNERSHIP

There will be opportunities for Oakville leadership and staff to connect to other organizations over the course of the Digital Plan to aid the Town in educating staff, developing standards, and implementing various components of the Digital Plan.

Legend

Phases: 1. Tech and Data Foundation | 2. One Window Solution | 3. Model-Based Development Approvals | 4. City Information Modelling

Low Significance — High Significance

High Level Architecture

Platform Design Principles

To achieve a successful modern digital platform that can enable growth. Key principles are defined and assumed for the project:

Simplification

1. The platform must be easy to use and change. Users of the system should be able to easily navigate and perform activities.

Reuse

2. The platform must be designed agnostic of the town that is utilising the platform while business rules and workflow will be town specific, the platform should not be tightly coupled into any town systems

Agility

3. Business rules and workflow changes should not require lengthy development lifecycle. These must be easily maintained and configured. The platform UI should have a simple interface that does not require a specialised skills to change

Information Management

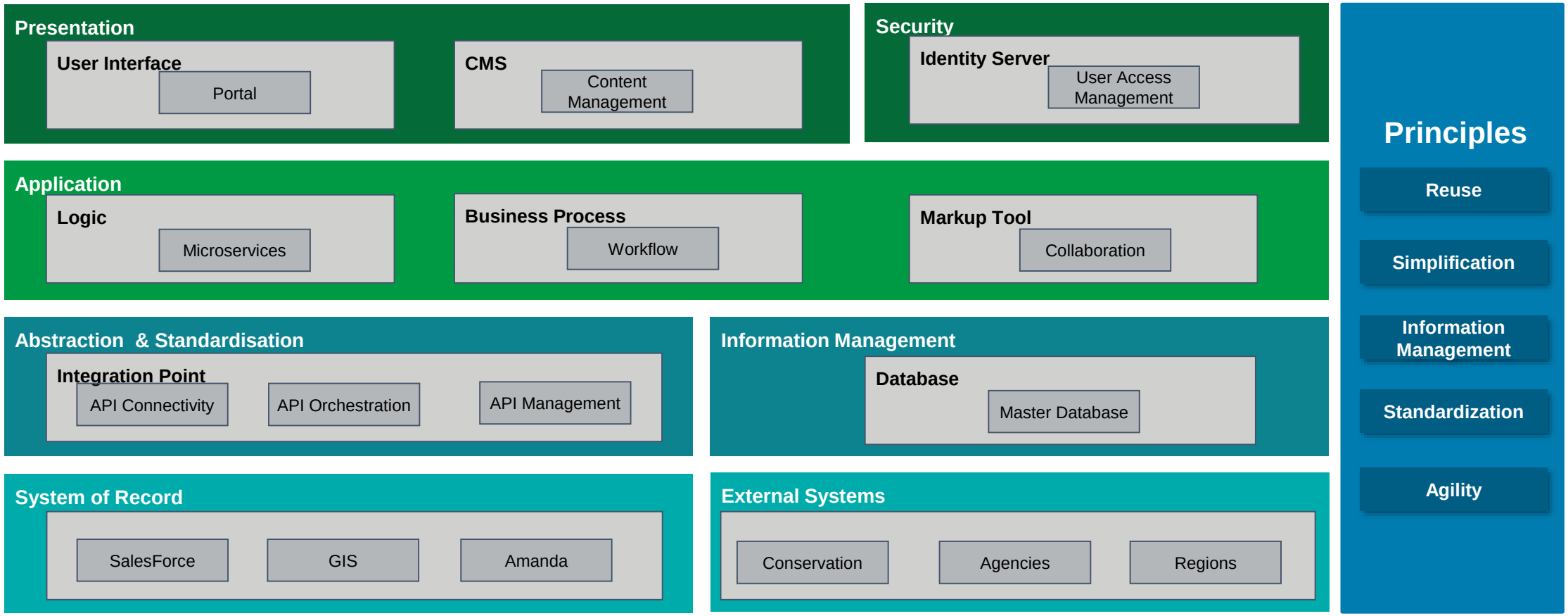
4. Creating a single source of truth for the town to receive and review data in a standardized format throughout the property development process while adopting standards for the intake of documents to ensure consist, quality submissions

Standardization

5. Integration into town systems and external systems should follow a standard. This is to ensure that the platform is not locked into a specific vendor-based product (e.g., CRM)

High Level Architecture Principles

A high-level solution architecture defines how different parts of the platform come together and the components that need to be integrated to make it work. Examples of some components that warrant future market scan and analysis to determine the definitive solution architecture and data source to target mapping for the functional platform and its foundation. This high-level solution architecture provides a basis for the base components that make the solution (across the 3 proposed programs) work, taking into consideration that some elements are existing or in process of being procured (e.g. CRM, Amanda, drawing Mark-up tool) and subject to integration as opposed to custom development.



High Level Architecture

Component	Definition	Principle	Supported Pillar
User Interface	Web based front end application	Simplification	People
CMS	Content Management System used to store FAQ , general content and training material	Simplification	People
Integration Point	A centrally managed point where integration into various systems are coordinated and managed.	Reuse Standardization	Technology
Logic Application Layer	Functional layer to drive the execution of complex computation (e.g., pricing calculations)	Agility	Process, Technology
Business Process	Workflow engine used to drive the business process and supporting rules. This included a task-based engine	Agility	Process
Markup – Tool	Collaboration capability to enable sharing of notes and comments on documents	Agility	Process
Database	This is where data captured from the portal is stored (e.g., Applications , Audit trail etc.)	Information Management	Data
Systems of record	Systems in use and maintained in the city	NA	Data
External Systems	Systems outside of the responsibility of the city	NA	Data

Key components were identified in order to adhere to the architecture principles and digital transformation pillars: People, Processes, Technology and Data

Program Delivery

Proposed Project Team Construct

The project team that is being proposed will encompass all roles and responsibilities across the 3 proposed Programs. Below, we capture project team, stakeholder, and governance groups.

Oakville Team (Internal)

Executive Leads

- O — Executive Sponsor
- D — Strategic Sponsor
- D — Agency Rep. (ad hoc)

Project Leadership

- O — Client Lead

TPO & Architecture

- O — Project Manager
- O — Department Directors
- O — Change Management Leader
- O — IT Manager

Project Team (External)

Executive Leads

- D — Engagement Director
- D — QA Director

Project Leadership

- D — Engagement Lead/Scrum Master

TPO & Architecture

- O — Project Manager
- D — Project Delivery Lead
- D — Business Consultant
- D — Cloud Solution Architect
- D — Change Management Leader
- D — Change Management Analyst

Designers & Front-end

- D — UX Design Lead
- D — Front End Dev
- D — Front End Dev

Back-end, Integration

- D — Full Stack Dev
- D — Full Stack Dev
- D — Full Stack Dev
- D — DevOps Engineer
- D — Testing & Deployment
- D — Insights/Data Engineer
- D — Functional Support

Experts

- D — Cloud Platform SME
- D — Cloud Services Architect
- D — BIM SME
- D — Digital Business SME
- D — DevOps/Agile Practitioner

Roles & Responsibilities

Executive Leads

- Provide strategic direction and leadership to program / business
- Review and define project goals and objectives
- Provide resources necessary to execute project successfully
- Review final deliverables

Project Leadership

- Validate and confirm scope
- Plan, set direction and manage day to day project execution
- Lead workshops and all senior client conversations
- Review deliverables
- Manage and set expectations with executive leadership

Delivery Team

- Gather information and validate requirements and assumptions
- Produce deliverables and facilitate and lead day-to-day activities
- Deliver cloud architectures and repeatable patterns that can support development
- Implement platform and select use cases
- Test & Hyper care Support

Legend: O Oakville Resource (PT) | D Dev Resources (FT) | D Dev Resource (PT)

Glossary of Terms: Applicable to Program Delivery

Term	Description
Program Management Office (PMO)	A project management office (PMO) is a group or department that defines, maintains and ensures project management standards across an organization.
Transformation Program Office (TPO)	A transformation program office is much more than a traditional program management office (PMO), and it's a necessary element of any large-scale transformation. A transformation office improves time to value by maintaining focus on outcomes
Requirements Gathering	The process of generating a list of functional, technical and systematic requirements from several project stakeholders, such as clients, IT staff, product users or vendors. This list may likely include features, activities and tasks for a team to execute in order to achieve the goals of a project.
Hybrid-Agile Methodology	The combination of Agile methods (adaptive) with other non-Agile techniques (prescriptive). A detailed requirements effort is followed by sprints of incremental delivery. This allows for frequent iterative prototyping of a design, followed by a single plan-driven implementation.
Hybrid-Agile Blueprinting	A plan that incrementally builds the design, leveraging approaches such as Sprint or Kanban and defining the objectives to be achieved in the Sprints
Kanban	A framework that falls under the Agile umbrella and that is extremely visual. The Kanban process focuses on a continuous work low rather than fixed iterations like in other frameworks such as Scrum to produce shippable deliverables/products.
Platform	A hardware or software architecture that acts as a basic structure upon which applications, processes, and technologies are developed and run to enable business or work outcomes. A platform can also host an application or a service. Typically, a software platform supports many programming languages, engines, and web service.
Platform Development	Development of the fundamental software that makes hardware work and that provides a platform for application development.
Platform Architecture	A conceptual blueprint that shows the way ecosystem is divided into rather more stable platform s, supported by various complementary modules and design rules for their interconnected operation.
Solution Architecture (SA)	An architectural description of a specific solution. SAs combine guidance from different enterprise architecture viewpoints (business, information and technical), as well as from the enterprise solution architecture (ESA).
Cloud Architecture	The infrastructure that supports a cloud computing network and allows it to complete its functions when users call upon it. Elements of a cloud architecture cover the full spectrum of needs for users and systems within the cloud computing network, including both software and hardware and both front- and back-end technologies.
Front-end technologies	A set of technologies that are used in developing the user interface of web applications and webpages. With the help of front-end technologies, the developers create the design, structure, animation, behavior, and everything that users see on the screen when opening a web application, website or mobile app.
Back-end technologies	Used to create the server-side (configuration) of a website. The backend technologies form the basis of software development. Without specialized backend development, application designs and intuitive interfaces created using front end coding languages are not sufficient.

Glossary of Terms: Applicable to Program Delivery

Term	Description
Platform Configuration	Defines the computers, processes, and devices that compose the platform system and its boundary. Defining and setting the hardware and software details for elements of a cloud environment to ensure that they can interoperate and communicate.
User Experience Design	User experience design draws from design approaches like human-computer interaction and user-centered design, and includes elements from similar disciplines like interaction design, visual design, information architecture, user research, and others.
Design Principles	A Well-Architected Framework aids users in the development of secure, high-performing, resilient, and efficient infrastructure for their applications. Cloud architecture design principles are usually based on five pillars: operational excellence, security, reliability, performance efficiency, and cost optimization.
Compute, Storage, and Database	Defining the processes that need to run, like software, over the internet, and storing data on servers to make it accessible over the internet. Cloud storage allows users to store digital data files on virtual servers. This is defined as a data deposit model in which digital information such as documents, photos, videos and other forms of media are stored on cloud servers hosted by third parties.
Functional Use-Case	A functional use-case is a description of a function of a system which exists to satisfy the needs of a business area or individual in accomplishing their daily tasks. Use cases are an analysis technique (done during requirements specification and analysis phases) Intend to describe (sometimes formally) how a system should work.
Testing	A level of testing that validates the complete and fully integrated software product. The purpose of a system test is to evaluate the end-to-end system specifications. Usually, the software is only one element of a larger computer-based system. Ultimately, the software is interfaced with other software/hardware systems. System Testing is defined as a series of different tests whose sole purpose is to exercise the full computer-based system.
User Acceptance Testing	Also called end-user, user acceptability testing, or beta testing, is the process of testing software by a select group of the users from different business areas (those who will actually use it) to see if the product is acceptable for release or not. The testers are familiar with the software's business requirements, so they can adequately gauge the product's readiness.
User Journey Design	A user journey is the experiences a person has when interacting with something, typically software. This idea is generally used by those involved with user experience design, web design, user-centered design, or anyone else focusing on how users interact with software experiences.
User Journey Mapping	User journey mapping (sometimes called a customer journey) is a way to understand the experience of a software interface or online portal from a visitor/user's point of view.
Scrum Ceremonies	Scrum ceremonies are important elements of the Agile software delivery process. These important events are not just meetings for meetings. They provide the framework for Scrum teams to get work done in a structured manner. The ceremonies also help to set expectations, motivate teams to collaborate, and drive results.
Sprint	A Sprint is an iteration of an Agile project. In other words, it is common for project teams to break Agile projects into short, repeatable phases. These phases typically last between one and four weeks. Each Sprint has a specific, measurable outcome
Hyper-care	Hypercare is the period of time immediately following a system Go Live where an elevated level of support is available to ensure the seamless adoption of a new system

Glossary of Terms: Applicable to Program Delivery

Term	Description
Systems engineering	Systems engineering is an interdisciplinary field of engineering and engineering management that focuses on how to design, integrate, and manage complex systems over their life cycles. At its core, systems engineering utilizes systems thinking principles to organize this body of knowledge.
Integration	The process of combining data from different sources into a single, unified view. Integration begins with the ingestion process, and includes steps such as cleansing, and transformation. Data integration ultimately enables analytics tools to produce effective, actionable business intelligence.

Implementation Planning

We recommend a structured, but flexible approach to deciding upon the team and solutions that comprise the program roadmap includes evaluation preparation, demo facilitation, and tool selection ensuring fairness throughout the process to support the commercial decision to selecting your preferred system solution providers.

Systems Selection Process	Key Activities
Evaluation Preparation	1. Develop evaluation methodology based on Current and Future State Assessments, and discussions on Core Considerations 2. Conduct evaluator prep sessions with Business and Technical evaluators on how to assess vendor demos
Demo Facilitation	1. Develop vendor package containing an agenda for demos, evaluation criteria, business requirements and use cases, technical requirements, vendor experience, and total cost of ownership 2. Issue Non-disclosure agreements (NDAs) to all vendors 3. Distribute vendor package to the three shortlisted vendors 4. Conduct vendor demos that cover an overview of the solution and company, functionality of the solution, and addresses outstanding technical and functional questions
Solution Selection	1. Compile evaluation results (via survey) received from the Business and Technical evaluators 2. Aggregate survey results to determine scoring for each vendor 3. Achieve consensus on evaluation of vendor experience 4. Agree on tool selection based on completed evaluation results

Typical selection Criteria and weighted scores

Criteria	Weighting
A. Business Requirements	30%
B. Ease of Use	10%
C. Critical Functionality	15%
D. Technical Requirements	15%
E. Vendor Experience	15%
F. Total Cost of Ownership	15%
Total Score	**100%**

A trusted secure ecosystem is built on a set of principles

A digital platform comprised of multiple points of interconnectivity, variety of behaviour, and exchange of large volumes of data poses challenges that can be better mitigated with new approaches rather then the traditional static cybersecurity principles.

Zero Trust Model

A zero-trust model approach means security starts at the front gate or entry point and it should consist of mutual authentication. Only a person or device with an authenticated identity can complete a connection and access to a service.. For the Oakville platform, mobile devices and cloud services mean that a defensible network perimeter is not nearly as well defined as in the past. Lines have expanded and blurred. There is no secure zone inside a so-called perimeter, as it was known in the past. Every service access should require an authentication process.

Transparency & Privacy

In highly distributed architectures and with a high variety of technology stacks, data privacy must be achieved during the course of data motion. Dynamic Data Masking enables to monitor and intercept transactions coming from the “Access Points” and apply the configurable policies to monitor and control customer privacy. Where relevant, transaction data will be modified, e.g., masking of customer private data, intellectual property and data will be protected in the access points by changing the result of the transaction and what is being displayed.

Regulations & Compliance

Privacy Regulations are leading to several restrictions in the use and protection of personal data throughout the world. The Oakville platform needs to assure the necessary level of Digital Trust for customers and workforce. To assure this Digital Trust, the platform needs to assure users that they are protecting and using their customer data on a need-to-know basis and with their specific consent. This needs to be fully auditable, traceable and directly integrated with the Identity, Access and Relationship Management framework.

Interoperability

Considering the high number of connections required, and its diversity, the Oakville platform should add micro segmentation to its security arsenal. Micro segmentation separates and creates barriers that help contain potential threats, stopping a bad actor or a single infected device from compromising municipal services based on application and data layers, instead of IP layers. This brings flexibility and granularity when segregating networks and securely manage interoperability between IoT and IT networks.

Risk based Identity

Behavioral analysis of entities other than users, such as routers, servers and endpoints is crucial. UEBA is much more powerful because it can analyze behavior across multiple users, IoT devices and IP addresses, to detect complex attacks. A user or device’s risk changes with their behaviors within the smart environment. A risk-based approach will have a positive impact on the security policy application. This calculation needs to be made and enforced in real time to avoid data breaches and illegal accesses.

Resiliency

As a large, scalable and diverse ecosystems, the Oakville platform will also scale the number of different types of incidents. Reactions will sometimes be repetitive and with patterns. The use of machine learning to adapt ant automate the response will create a competitive advantage in reducing the time to respond. Also, with the presence of a high number of entities and devices, orchestration will be crucial to automate these interactions.

OAKVILLE

Property Development Digital Plan: A Digital Transformation Solution

Benefits and Benefits Management Plan

AECO innovation lab

in partnership with

Deloitte.

Defining the Benefits of the Digital Vision, Plan, and Roadmap

There are **numerous benefits** that can be achieved through the complete implementation of the four programs proposed in the Digital Plan. These benefits range from improved **internal efficiencies, higher staff engagement, higher customer satisfaction,** and **better-quality data** that can be used in both the property development service as well as in other business areas.

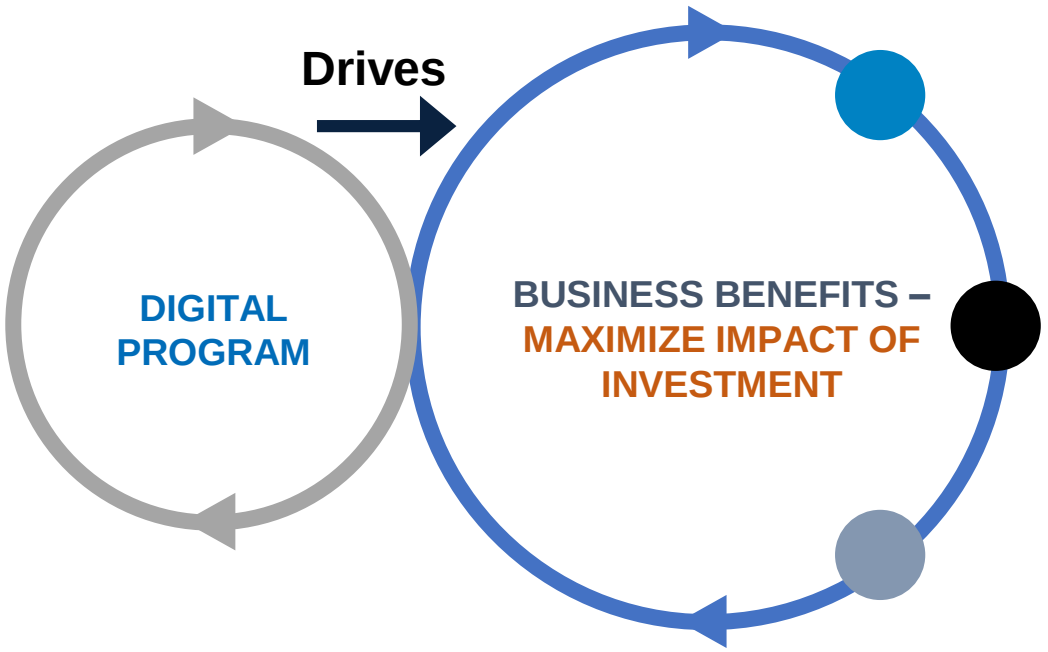
In this section, these benefits will be broken out across the programs and be assigned monetary values.

Additional examples of savings and benefits from international jurisdictions will also be examined and scaled to Oakville as a point of comparison.

Benefits Realization

Digital Plan Benefits Framework: Methodology

The business case is anchored on ROI, with a focus on three pillars namely workforce value, operational efficiency & productivity, and value creation. Quantitative metrics are calculated for efficiencies gained in fulfilment of workforce duties and outcomes where platform-based automation and controls will solve for the pain points articulated by Oakville stakeholders as primary factors in time and productivity losses.



Quantitative metrics		Share of value:
Workforce value	• Employee satisfaction • Employee retention • Employee productivity	30%
Increased operational efficiency	• Reduction in errors • Hardcopy reduction • Reduced re-work • Reduced quality control at intake • Reduced time to queries resolution • Reduced time for database search Reduced time in combined mark-up • Workspace utilization (hybrid)	70%
Value creation	• Add-on services (client) • Marketing (client) • Data monetization (client, 3rd party) • Number of applications • Customer satisfaction & engagement	

The analysis will unpack what each initiatives mean for the various parties within Town of Oakville

Employees **Clients** **Development Planning** **Town of Oakville**

Program impact: High | Medium | Low

Digital Plan Benefits Framework: Workforce Value

This parameter of quantifiable benefit pertains to engagement of staff. Where a platform is created that is designed to deliver outcomes based on the business process, configured to the needs and workflows of the individuals, this brings with it benefits in satisfaction and engagement.

Productivity and Performance

The measure of being able to do more in the time we have

66% of employees who work in a fully-enabled digital workplace reported a positive impact on productivity

70% cite improved collaboration thanks to digital technologies
Vs
55% of employees who don't work in a fully enabled digital workplace

Target gains: 10% improvement

Basis: Increased output to the value of 4 hours per week per employee through improved process and automation

Program impact:

Attraction and Retention

Gains in time and cost through avoidance of new onboarding, training and loss of institutional knowledge

66% of highly engaged employees reported that they had no plans to leave their company
Vs
33% of disengaged employees who are actively looking for new work

Target gains: 30% reduction in churn

Basis: better conditions and improved satisfaction with digital practices will result in improved retention to the value of 1 mid-level person per year

Program impact:

Engagement

Personalization of process according to individual role and accountability to improve satisfaction and ease of collaboration

86% of employees and executives cite lack of collaboration or ineffective communication for workplace failures

Gallup reports companies with greater engagement outperform those without by 20%

Target gains: 20% improvement

Basis: Workforce satisfaction surveys to yield improved reports of ease of accomplishing tasks with reduced frustration in collaboration and accountability tracking

Program impact:

Program impact: High | Medium | Low

Digital Plan Benefits Framework: Operational Efficiency

This parameter of quantifiable benefit pertains to the effort and cost of doing business on a day to day basis. Understanding where time is lost that can be regained through better processes, where cost can be avoided in material consumption, as well as ease of access to data. This all equates to hours reinjected into the department to be used on other more meaningful tasks that benefit outputs.

Reduction in Errors

Quality of submission and attached data to yield less discrepancy. Automation and templatized process to improve speed and accuracy of quality assurance.

Targeted improvement: 3% (240 dept. hours per month)

P1 | P2 | P3

Reduced Rework

Duplication of effort, version control, streamlined workflows to reduce abortive effort and uncoordinated delivery of effort

Targeted improvement: 3% (240 dept. hours per month)

P1 | P2 | P3

Query Resolution

Time taken to request and receive documentation, answer or solve query through FAQ, process documentation, and tagged request to colleagues.

Targeted improvement: 3% (240 dept. hours per month)

P1 | P2 | P3

Collaborative Mark-up

Cloud-based mark-up for real time commentary linked to live-file access by colleagues (and applicant) for on-server modification and version control through platform.

Targeted improvement: - 3% 240 hours) reduction in time

P1 | P2 | P3

Reduction in Hardcopy Printing

An emphasis on digital work and documentation for checking and correspondence

Targeted improvement: 50% reduction ($50 per person per month)

P1 | P2 | P3

Reduced Quality Control at Intake

Correcting and checking submission documentation which costs unnecessary man-hours placing burden of incomplete documentation on Oakville workforce. Create quality barrier for entry through automation.

Targeted improvement: 8% (640 dept. hours per month)

P1 | P2 | P3

Documentation Search

Time taken to source, filter, search and recover documentation based on search of content data, filename, file-type, or document ID.

Targeted improvement: 3% (240 dept. hours per month)

P1 | P2 | P3

Workspace Utilization

improved hybrid workforce capabilities and cloud-first approach.

Targeted improvement: 10% saving in facilities overhead

P1 | P2 | P3

Program impact: High | Medium | Low

Digital Plan Benefits Framework: Value Creation

This parameter of quantifiable benefit pertains to the value that can be added to customers and local businesses through the establishment of platform services. This does not yield dollar impact to the benefits ROI calculation, but provide a basis that would allow for future tracking.

Add-on Services

Provide catalogue of portal services linked to application, i.e., connection to contractor database, GIS data, community programs, etc.

Targeted impact: build citizen loyalty and engagement, create a database of personalized interests for analytics.

Data Monetization

As custodians (‘centre of intelligence’) of customer, city, GIS, market, and ESG data, become a hub of insights generation upsell

Targeted impact: Provide the market and individuals with information that would benefit project feasibility, research and businesses

Customer Satisfaction and Engagement

A better and more transparent experience makes Town of Oakville a trusted business partner and catalyst for economic growth.

Targeted Impact: happier citizens, better community participation, the ability to roll-out programs with greater adoption

Marketing

Leveraging customer analytics and database, direct personalized marketing to events, services and products from within the Oakville community

Targeted impact: support local business, be a connector of B2C economic activity

Number of Applications

Improved automation and speed to resolution through productivity gains would increase capacity to speed up permit approvals and improve quality of submissions

Targeted impact: better developments based on community and city data insights, reduce housing shortage, spare developers supply chain volatility by getting to ground sooner

Business Case Framework – Program 1

Overall Salary Cost as basis for $ value: $8,000,000
Total Staff: 100
Average rate per employee: $80,000 person/year
Total FTE: 8000 man-hours/month
Cost FTE: $41/person/hour/month

Metric	Baseline (% of time spent)	Target (% of time spent)	Expense ($) i.e., licensing, consumables	Target expense ($)	Impact on hours (Recovered per month)	Gained per month ($)
Errors	5	2			240	9,840
Re-work	5	2			240	9,840
Intake quality control	10	2			640	26,240
Query	5	2			240	9,840
Database search and file	5	2			240	9,840
Sub-total	**30**	**10**			**1,600**	**65,600**
Hardcopy			100 (per person)	50 (per person)		7,500
Licensing				15,000		-15,000
Data and consumption				2,000		-2,000
Employee churn (per year)	2 (# employees)	1 (# employees)	26,600	13,300		13,300
Employee productivity	**-**	**10**			**800**	**32,800**
Facilities management (based on hybrid footprint)	@$10/sqft per person, assuming 30% reduction in space made possible		$36,000 per month	$25,200	-	$10,800
Grand-total					**2,400**	**$113,000**
Time to resolution	3 months (per application)	2,5 months	-	-	-	**3 saved/person/month** (2,400 hours @ 40hrs/per week)

Business Case Framework – Program 2

Overall Salary Cost as basis for $ value: $8,000,000
Total Staff: 100
Average rate per employee: $80,000 person/year
Total FTE: 8000 man-hours/month
Cost FTE: $41/person/hour/month

Metric	Baseline (% of time spent)	Target (% of time spent)	Expense ($) i.e., licensing, consumables	Target expense ($)	Impact on hours (Recovered per month)	Gained per month ($)
Errors	5	2			240	9,840
Re-work	5	1			320	13,120
Intake quality control	10	2			640	26,240
Query	5	1			320	13,120
Database search and file	5	1			320	13,120
Sub-total	**30**	**7**			**1,840**	**75,440**
Hardcopy			100 (per person)	40 (per person)		9,000
Licensing				15,000		-15,000
Data and consumption				2,000		-2,000
Employee churn (per year)	2 (# employees)	1 (# employees)	26,600	13,300		13,300
Employee productivity	**-**	**12**			**960**	**39,360**
Facilities management (based on hybrid footprint)	@$10/sqft per person, assuming 30% reduction in space made possible		$36,000 per month	$25,200	-	$10,800
Grand-total					**2,800**	**$130,900**
Time to resolution	3 months (per application)	2,5 months	-	-	-	**3.5 saved/person/month** (2,800 hours @ 40hrs/per week)

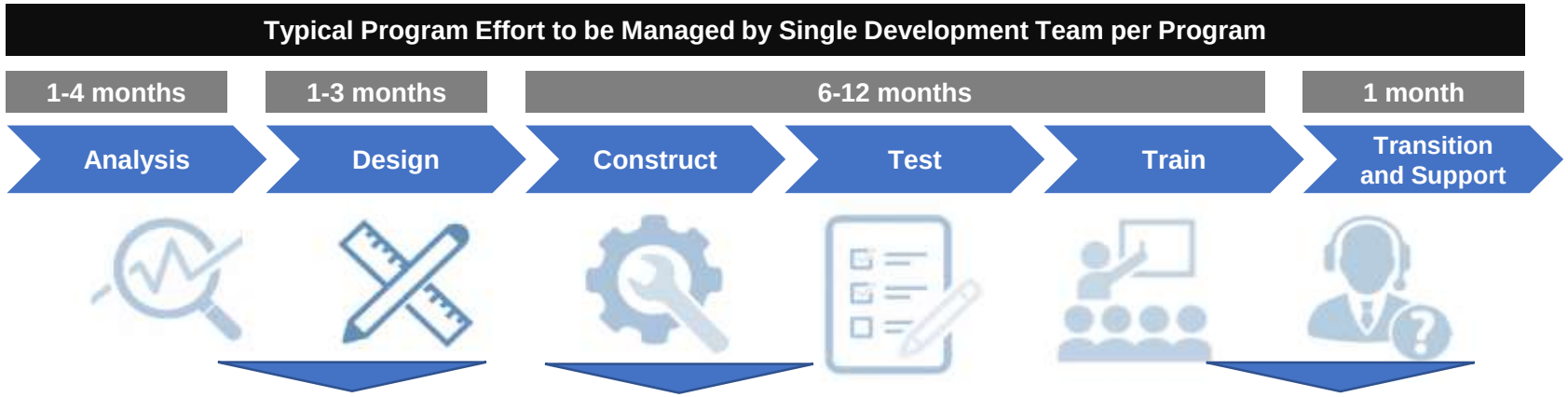
Business Case Framework – Program 3

Overall Salary Cost as basis for $ value: $8,000,000
Total Staff: 100
Average rate per employee: $80,000 person/year
Total FTE: 8000 man-hours/month
Cost FTE: $41/person/hour/month

Metric	Baseline (% of time spent)	Target (% of time spent)	Expense ($) i.e., licensing, consumables	Target expense ($)	Impact on hours (Recovered per month)	Gained per month ($)
Errors	5	1			320	13,120
Re-work	5	1			320	13,120
Intake quality control	10	1			720	29,520
Query	5	1			320	13,120
Database search and file	5	1			320	13,120
Sub-total	**30**	**5**			**2,000**	**82,000**
Hardcopy			100 (per person)	50 (per person)		7,500
Licensing				15,000		-15,000
Data and consumption				2,000		-2,000
Employee churn (per year)	2 (# employees)	1 (# employees)	26,600	13,300		13,300
Employee productivity	**-**	**20**			**1,600**	**65,600**
Facilities management (based on hybrid footprint)	@$10/sqft per person, assuming 30% reduction in space made possible		$36,000 per month	$25,200	-	$10,800
Grand-total					**3,600**	**$162,200**
Time to resolution	3 months (per application)	2 months	-	-	-	**4.5 days saved/person/month** (3,600 hours @ 40hrs/per week)

Indicative Costs

The following represents a typical expression of effort and cost in platform design, implementation and support, comprised of three (3) Programs over the next five (5) years.



Category of Cost	2023	2024	2025	2026	2027
One Time: Internal Resource Costs[1]	TBD	TBD	TBD	-	-
One Time: Implementation Partner Costs[2]	$1,000 - $2,000 (Program 1)	$0 - $1,000 (Program 2)	-	$1,000 - $4,000 (Program 3)	-
One Time: Contingency Costs[2]	$0.300	$0.700	-	-	-
Ongoing: Support Cost	-	-	$0..400	-	$0..400
Ongoing: License Costs[3]	$0.250	$0.500	$0.500	$0.750	$0.750
Ongoing: System Administrator[4]	-	-	$0.100	$0.100	$0.100
Total Annual Investment Costs	**$2,550**	**$2,200**	**$1,000**	**$4,850**	**$1,250**
Time to ROI (based on productivity gains)	**22 Months**	**16 months**	**6 months**	**30 months**	**8 months**

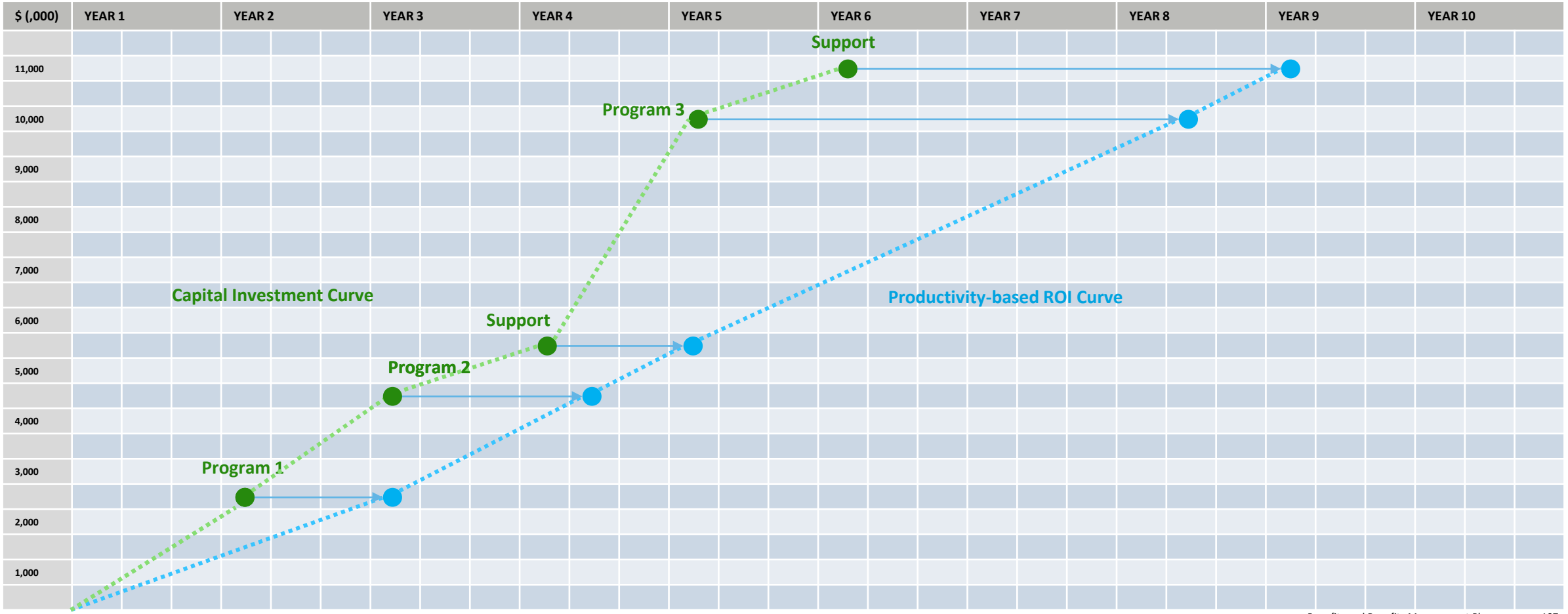
Footnotes:
1 –Driven by how internal resource time is captured, allocated and treated
2 –This can range from hundreds of thousands to millions depending on requirements, integrations and conversions
3 –Depends on the vendor's license model
4 –Internal IT costs, normally including in the IT operating budget

*All values in thousands

**Figures can vary significantly

Business Case Framework – Path to ROI across 10 Years

The following represents a typical expression of effort and cost in platform design, implementation and support, comprised of three (3) Programs over the next five (5) years.



Business Benefits: Outcomes

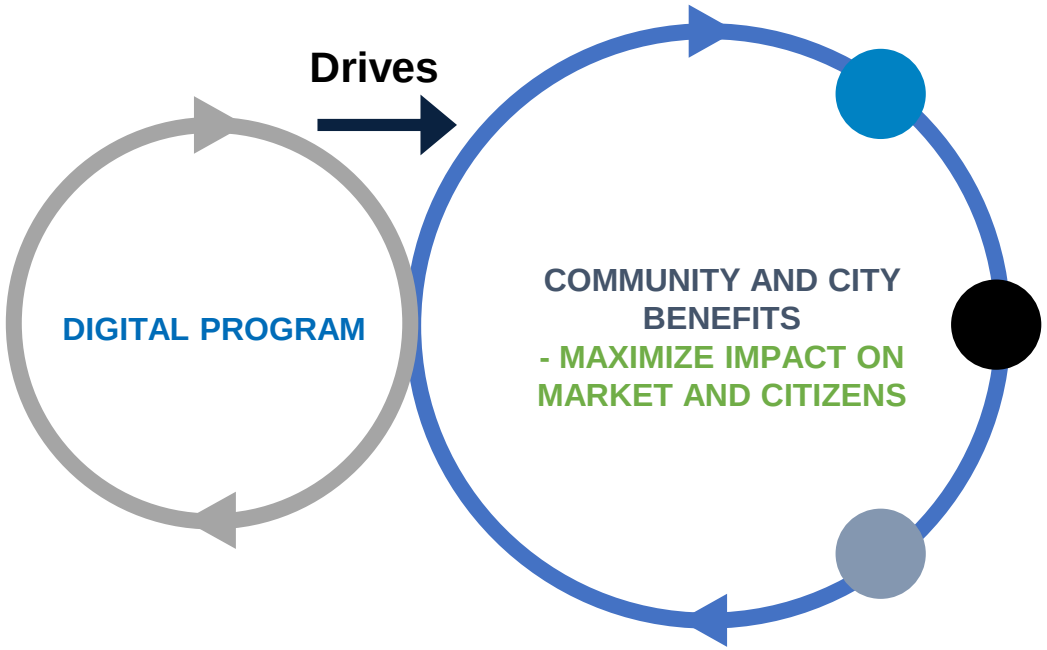
Assuming a conservative impact of 10% boost to operations and production outputs by staff, this program brings some quantifiable benefits to support the business case for investment.

$113,000 - $162,200 in Oakville's pocket every month following successful implementation of all Programs (not accounting for inflation)	✓ Gained through impact on process and productivity where time saved is quantified in Dollar terms as a percentage of salary spend
A 4-day workweek is possible to implement without losing output	✓ Through time reduction in day-to-day activities amounting to 800 department hours recovered per month
ROI in 9,5 years* through improvements in productivity and process based on $10m investment across 3 programs	✓ Making it possible to achieve sequential roll-out and recovery of cost of all 3 programs within 10 years.
30% more permit applications can be processed on current capacity	✓ Factoring in time and staff based on additional time in hand through reduction of abortive effort and access to information
New value delivery through application data analytics	✓ Bringing new insights to the market as an additional layer of service delivery and establishing Oakville as a trusted partner in sustainable and feasible development

*Assuming 24 months total time for implementation or programs

Digital Plan Benefits Framework

The business case is anchored on ROI, with a focus on three pillars namely workforce value, operational efficiency & productivity, and value creation.



Qualitative metrics (excluded from calculations)

Sustainability	• Reduced carbon footprint from better buildings • Higher socio-economic benefit through better developments • Better planning for infrastructure • Business continuity (basic expectation) • Carbon footprint from reduced travel (virtual inspection and consultation) • Cost avoidance (asset modernization or relocation)
Housing supply and development	• More compliant and responsible housing • Better time to value for developers of construction and improved yield for developers (lower market and supply chain volatility)
Citizen engagement	• Improved collections and number of rate payers, active citizens • Performance based codes

The analysis will unpack what each initiatives mean for the various parties within Town of Oakville

Employees **Clients** **Development Planning** **Town of Oakville**

Program impact: High | Medium | Low

Digital Plan Benefits Framework: Sustainability

This parameter of quantifiable benefit pertains to gains in environmental and economic resiliency or additive impact to the Town of Oakville. This is achieved through the indirect impact on better developments, improved and lean processes

Reduced Carbon Footprint (Buildings)

By virtue of a more detailed investigation of applications that can capture modelled data related to building energy performance, this program would enable better buildings and reduced consumption in the town, having an indirect impact on overall Town of Oakville ESG performance. This can be captured as data and reported on as a proof of town commitment to path to net zero.

Better Infrastructure Planning

By considering the planned development in context through access to broader GIS data, and development data of adjacent sites, as well as external data (e.g., traffic data), will allow for better scenario planning and future resiliency planning of roads, linear assets, and social amenities.

Reduced Carbon Footprint (Transit)

The ability to render virtual services, mixed reality inspection, hybrid consultation, and a cloud-based work from home capacity will reduce time spent on the road and vehicle miles driven – leading to reduced GHG and carbon emissions.

Socio-Economic Impact

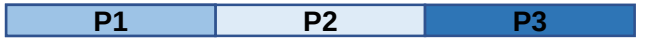
Integration with external data, such as market data, traffic data, economic data, even climate data, means that applications can be considered in their context, not just for compliance on the site itself. Real-time master planning will allow for improved development incentivization and design adjustment to make it appropriate for its area and contributory to economic growth and social balance in the area. For example, tweak the retail program and include a social amenity for a new project to give better value to adjacent residents with upside to developer with increased GLA.

Business Continuity

A digitized platform with automated controls will generate a 24/7 capability for the town. Allowing for flexibility of use, constant access to information, and ongoing customer engagement to help citizens feel as though they always have an outlet for an answer or a service.

Cost Avoidance (Capital projects)

Increasing the standard of submission to BIM, means that projects will be executed better in construction. Quantifiable evidence from market proves that BIM projects reduced time to completion, cost accuracy, reduction of waste, and reduction of errors requiring check-back or variation of approved submissions.



Program impact: High | Medium | Low

Digital Plan Benefits Framework: Housing Supply and Development

This parameter of qualitative benefit outlines the impact that a vastly improved permitting process will have on the market of residential development, including an improvement on supply of housing units through reduced time to approval, as well as bottom-line benefits to developers.

Better Compliant and Responsible Housing Mix

Inclusive zoning creates a challenge for many developers, but by having a more integrated approach to balance and mix relative to the context will allow for a ‘give to get’ opportunity between the Town and the market. Reward allocations with better GBA opportunities on site and assist in championing/incentivizing new developments in the market.

Better Time To Value For Developers

Reducing time to permit approval allows developers to get into ground sooner, avoid volatility in the market regarding material cost and plan labor with greater certainty.
These factors are all contributing to greater stress on the market and feasibility of new development.
Every month delayed results in a net impact of $10 per sq metre for developers according to research.

Program impact: High | Medium | Low

Digital Plan Benefits Framework: Citizen Engagement

This parameter of qualitative benefit outlines the impact that a vastly improved permitting process will have on the number of new developments ‘in the ground’ that contribute to overall citizen financial contribution to the Town and extent of increased citizen engagement through the establishment of a platform into which applicants would be onboarded.

Improved collections and number of rate payers, active citizens

Additional homes in the market means a higher number of contributing taxpayers to the Town of Oakville, elevating rate of collection to supply those newly housed citizens with services and preservation of amenities.

An increasing number of citizens that are provided permits through the new citizen portal are onboarded into the platform, contributing to rate of adoption in order to drive more active engagement and diversified service delivery – such as insights through data, personalized recommendations.

P1	P2	P3

Benefits Found in Example Jurisdictions

Benefits Found in Other Jurisdictions

Numerous international jurisdictions have started down similar paths to what is being proposed in Oakville.

While these examples are not directly comparable to Oakville due to different regulatory environments and different scales, they provide a basis for which Oakville's benefits can be identified. In some cases, the reported benefits are for partial completion of comparable Oakville programs.

Despite these differences, benefits have been realized across the world in a variety of geographic, political, and regulatory landscapes. This suggests that Oakville, despite differences from these examples, would see similar benefits.

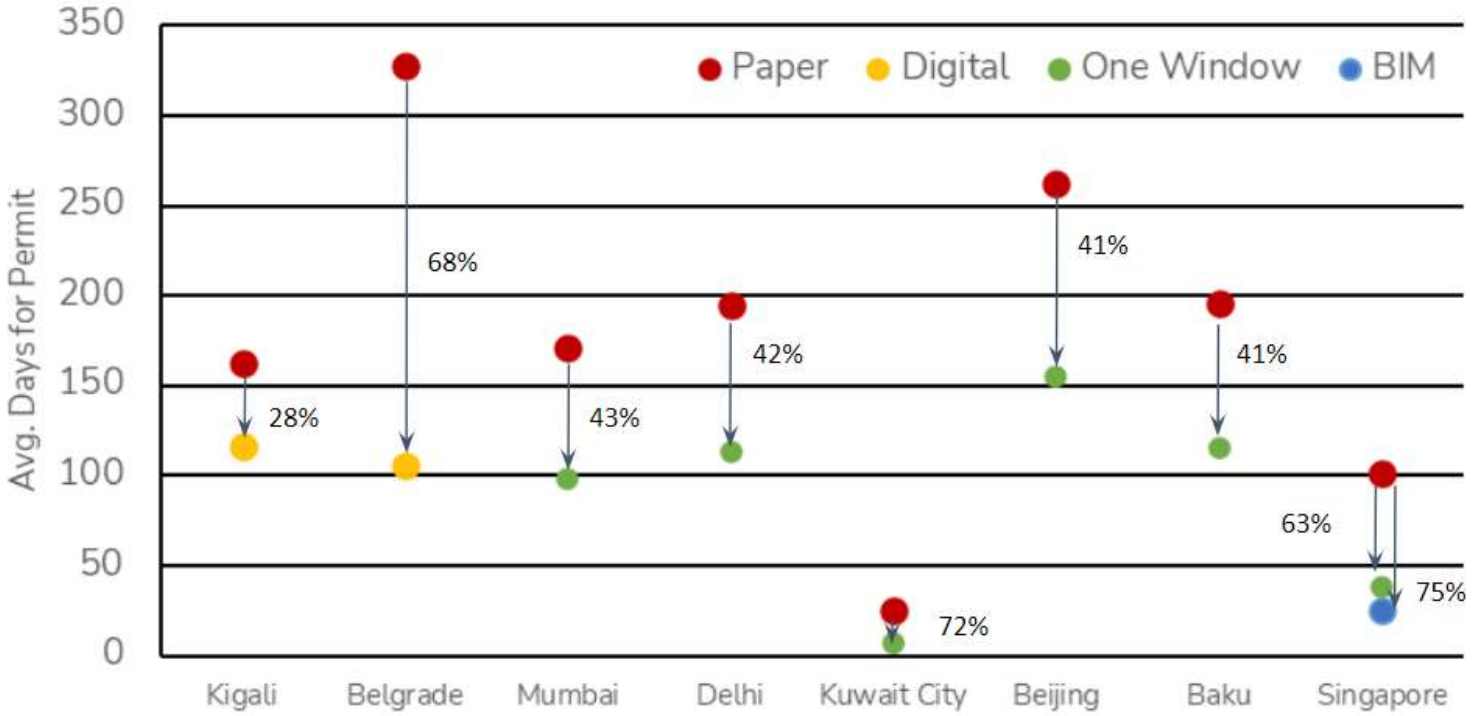
Time Savings from Example Jurisdictions

Time Savings

The World Banks *Doing Business* report and associated case studies report on how long it takes for building permits to be approved. The study looks at one or two municipalities in each country.

One case study in particular shows how electronic permitting systems (Oakville Program 1) and one-window solutions (Oakville Program 2) have significantly reduced the number of days it takes for municipalities who have adopted these systems. Decreases ranged from 28% to 72%.

Additionally, Singapore, who was the first to adopt BIM for development approvals, saw a decrease in duration of 75% compared to paper-based methods.



Cost Savings from Other Jurisdictions

Cost Savings

Jurisdictions have reported significant cost savings when implementing e-permitting and one-window solutions.

Locally, York Region has taken steps to streamline their internal processes and systems, equivalent to Oakville's Program 1, however this system is at a regional level which generally has less responsibilities that the lower tier municipalities, which

South Korea has implemented a program to streamline the municipal-levels permitting systems and adopt BIM. Significant savings have been realized and permitting times have decreased from 60 days to 15 days.

Singapore has adopted a one-window approach and BIM that have also resulted in significant savings for government and industry.

Example Jurisdiction	Description	Savings (in CAD)
York Region	• Regional level streamlining - no municipalities. • Equivalent to Oakville Program 1	$2.65M / year (Government benefits)
South Korea	• Streamlined, digitized permitting process for municipalities • Equivalent to Oakville Program 1	$2B / 12 years (Government benefits)
Singapore	• Streamlined, digitized permitting process for city-state • Equivalent to Oakville Program 1 and 2	$160M / year (Government and industry benefits)

OAKVILLE

Property Development Digital Plan: A Digital Transformation Solution

New and Emerging Technologies

AECO innovation lab

in partnership with

Deloitte.

Shaping Oakville's Future

There are many new, innovative technologies and processes that Oakville can introduce to enhance its property development services. This section will walkthrough:

- What are some of these **new and emerging technologies** that can aid Oakville.
- What **impact** these technologies may have on the Town's property development services.
- What some **Canadian jurisdictions** are doing in this space.
- What some leading **international jurisdictions** are doing in this space.

New and Emerging Technologies

New and Emerging Technology Opportunities

KEY FINDINGS & CONSIDERATIONS

From a historical perspective, developments in the architecture, engineering, construction, and owners (AECO) space have been slow. In recent years, many opportunities to create efficiencies have transitioned from other industries into the AECO sector. Now, many organizations involved in the AECO sector are turning to these technologies.

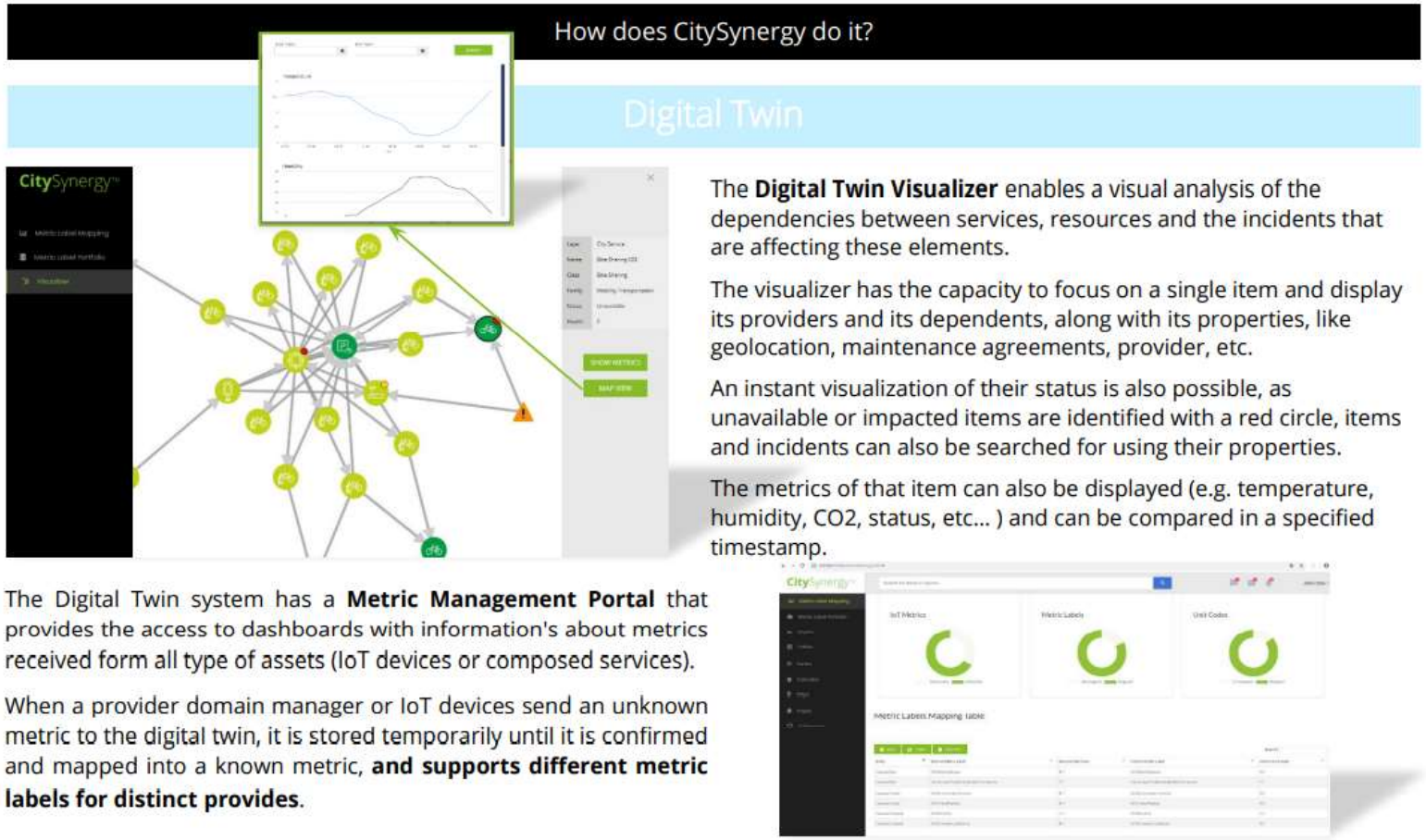
Some of these futuristic opportunities that are currently being explored both in a regulatory environment as well as elsewhere in the AECO sector include:

- Cloud-based smart city operating centres
- Digital twins for use in master planning
- Data-sharing ecosystems for smart buildings
- Artificial intelligence in generative design

QUESTIONS FOR EXPLORATION

1. What existing tools can Oakville leverage combine with these new technologies?
2. Which technological opportunities are of most interest to the Town?

Cloud Platform Opportunity: The Power of Custom Cloud Engineering Built on AWS CitySynergy: Smart City Operating Nerve Centre



The **Digital Twin Visualizer** enables a visual analysis of the dependencies between services, resources and the incidents that are affecting these elements.

The visualizer has the capacity to focus on a single item and display its providers and its dependents, along with its properties, like geolocation, maintenance agreements, provider, etc.

An instant visualization of their status is also possible, as unavailable or impacted items are identified with a red circle, items and incidents can also be searched for using their properties.

The metrics of that item can also be displayed (e.g. temperature, humidity, CO2, status, etc...) and can be compared in a specified timestamp.

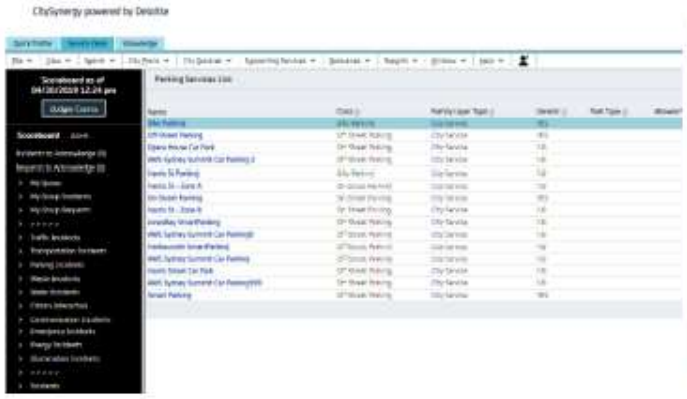
The Digital Twin system has a **Metric Management Portal** that provides the access to dashboards with information's about metrics received form all type of assets (IoT devices or composed services).

When a provider domain manager or IoT devices send an unknown metric to the digital twin, it is stored temporarily until it is confirmed and mapped into a known metric, **and supports different metric labels for distinct provides**.

Cloud Platform Opportunity: The Power of Custom Cloud Engineering Built on AWS

All the operations of the city are exposed on dashboards that allows the several stakeholders to analyse the evolution and reports of city events, KPI's and infrastructure. An analytics hub for selected geographic areas within the city is created, containing details of relationships between events and assets. The dashboards are configured to suit the changing requirements of each city in terms of vertical domains, operation and relevant events.

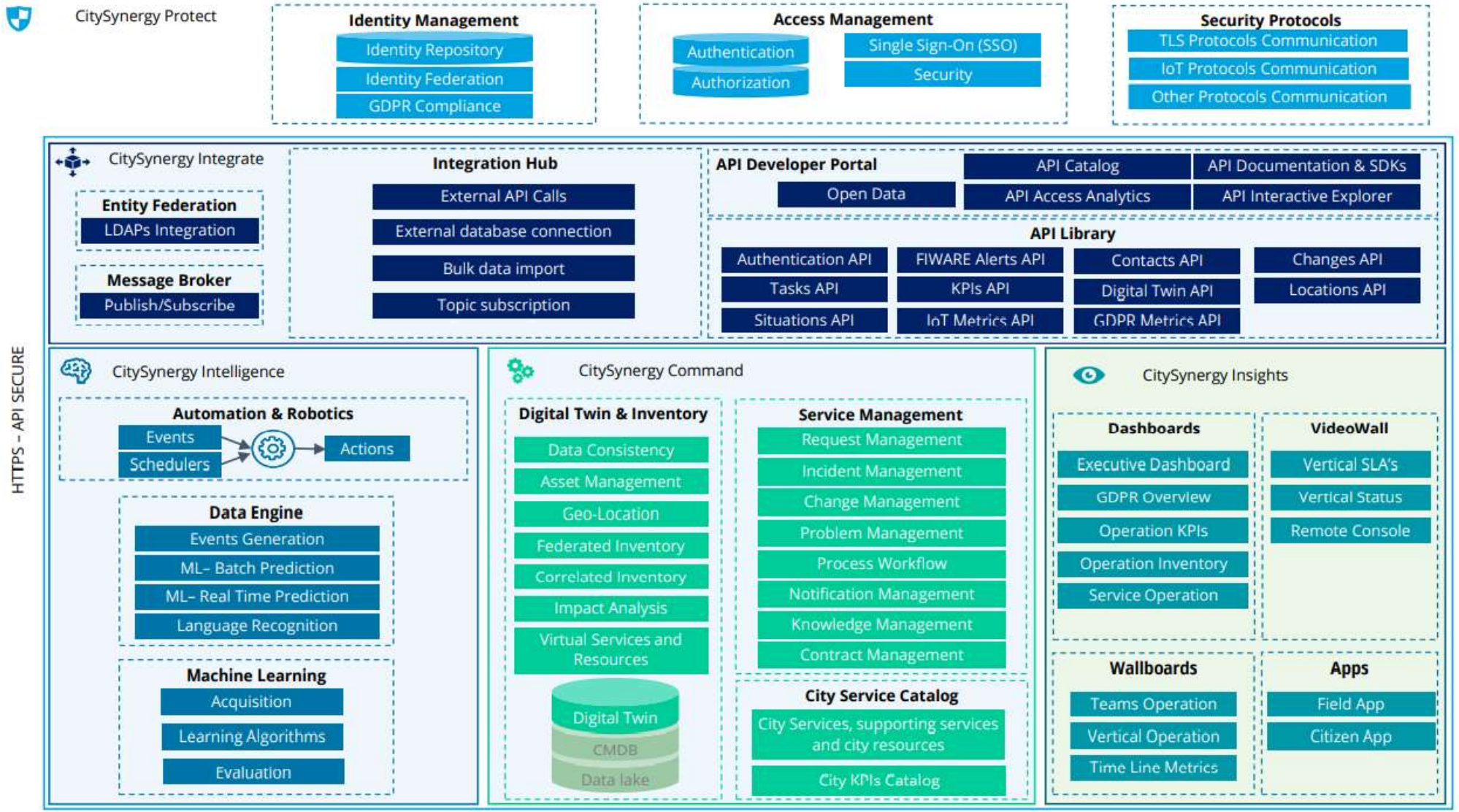
CitySynergy Insights Video wall with geotagged information, placed over the City map, with augmented reality on top of main incident and changes that are being solved by the command center professionals, providing an holistic and correlated vision of critical events happening on the city



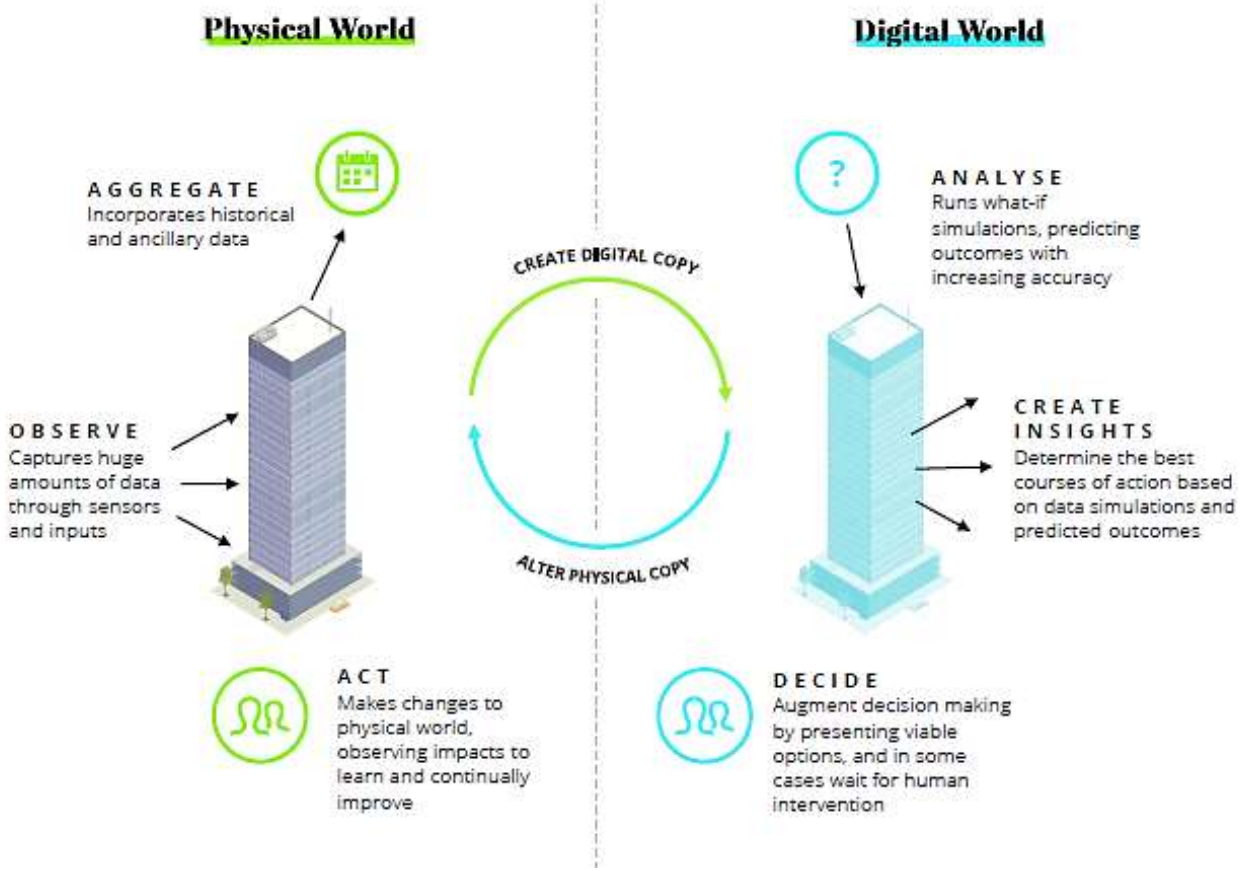
CitySynergy Command Service management operators dashboards with simplified tickets interface to help Level 1 operators to be more productive by providing a better overview of outstanding issues and their underlying context

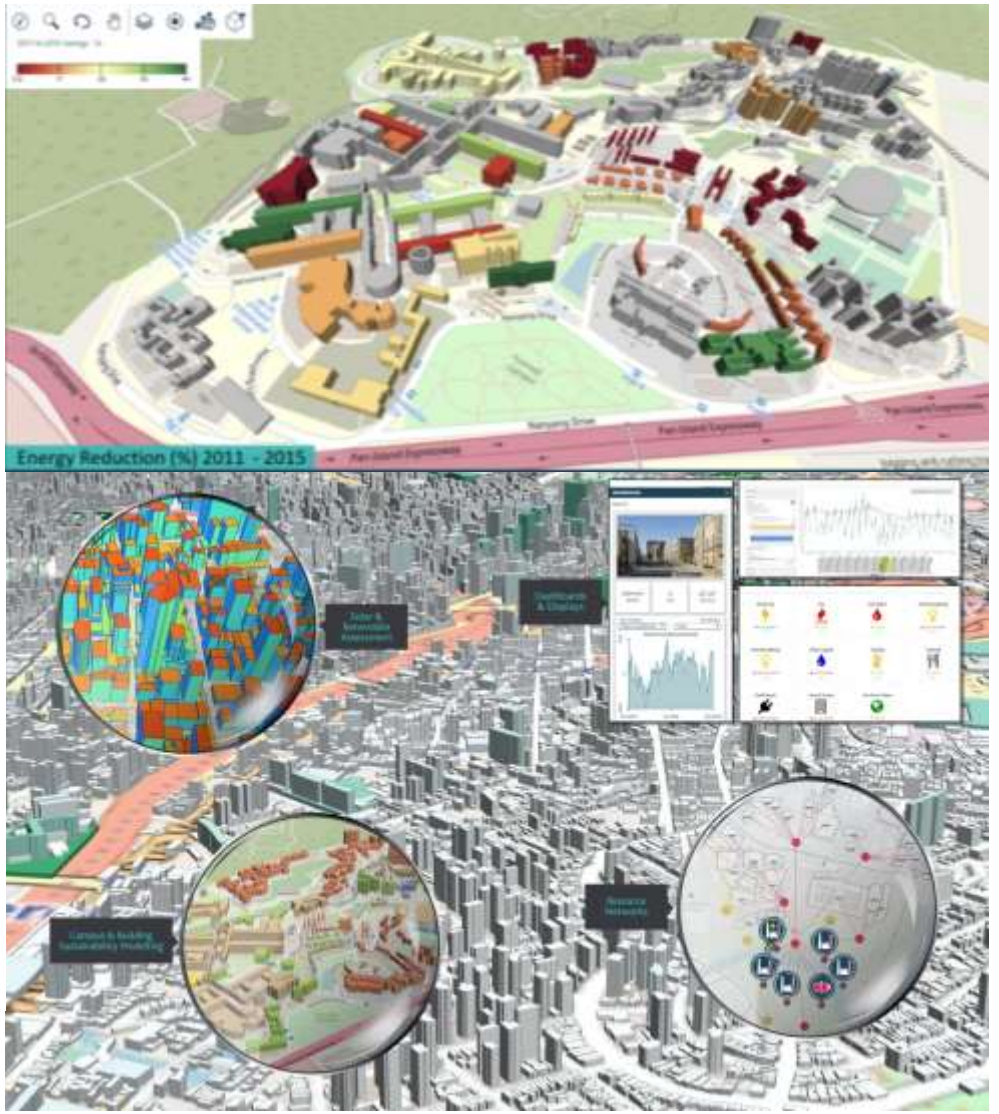
CitySynergy Insights operations wallboards to provide to each vertical domain of the city the essential KPI's for the managers control to ensure proactive service management of resources based on up-to-the-minute utilization information; it also monitors the SLA's compliance

Cloud Platform Opportunity: The Power of Custom Cloud Engineering Built on AWS



Master Planning & Digital Twin





Data Sharing Ecosystem | Smart Buildings: Defining the Digital Architecture

Standardizing the data that new projects contain in design and operations

Manual building	Automated building	Smart building	Thinking building
• Basic systems • Manually controlled • Full control, low efficiency • Basic materials • Manual occupancy input	• Independent automated systems • Centralized feedback • Less control, higher efficiency • More advanced materials, sensors and displays • Zoned occupancy	• Integrated systems • Interactive feedback to and from users • Inherent control, high efficiency • Reactive features and adaptable building structure • Real time optimization of building use	• Learning systems (AI) • Ambiguous data learning • Predictive control, higher efficiency • Future technology, control hardware, software, materials • Customized user experience based on predictions
Core	Reactive	Adaptive	Predictive

User Experience to improve workforce and customer engagement

Digital Operations to improve operational efficiency

Venue analytics to derive insights from data to improve business decisions

There are a range of new employee experience and service propositions made possible by emerging digital technologies

PLACE

RE-IMAGINE DIGITAL WORKPLACE / RETAIL

Utilising digital to re-imagine the workplace experience and improve engagement at the office

PEOPLE

ENABLE BLENDED EXPERIENCES

Utilising smart building Technology (Sensors, WiFi, IoT) to support the business process and users

TECH

AUTOMATED OCCUPIER/TENANT SERVICES

Enabling personalised tenant self-service, through artificial intelligence and virtual assistants.

SPACE

SMART CONSERVATION & CONTROL

Taking a data-driven and intelligent automated approach to FM and resource efficiency

Data Sharing Ecosystem

What if we established data standards for project submission & access to building operational data?

De-risking and Accelerating Project Submission & Real Time Master Planning

AI-Powered Master Planning

Smart and Sustainable Architecture and Urban Design	Digital Masterplan and Data Analytics	Financial and Capital Projects Strategy

Integrated financial modelling	Compare and surface similar land-use designs	Define and assess priority outcomes scores	Defining data sets to inform decision-making

Ensuring the right data is captured in the right way to deliver holistic, quantitative, and transparent urban design.

Transforming recommendations into the project **physical-and-digital blueprint** to guide project developers, architects, and engineers. As well as create a digital asset for operations.

Recommend land-use typologies and breakdown based on feasibility and market attractiveness

Examples of Inputs				Outputs
Yield Program	**Design Priorities**	**Quality of Life**	**Financial Outcomes**	**Physical and Digital program**
Use types	Parcel division	Sight lines preservation	Construction cost	Master plan design and feasibility
Building types	Zoning	Daylight maximization	Capital value	Digital master plan and business case
Leasable area	Massing strategies	Walkability	Net profit	BIM execution strategy
Unit / Tenant mix	Circulation strategies	Sun focus	GLA targets	Data management strategy and solutions
Open space	Open space strategies	Access to amenities	Loss ratio	Market value forecast and analysis

De-risking and Accelerating Project Submission and Real-Time Zoning

Discover radically better designs for projects

Early-stage challenges create overruns in time and budget:

- Decentralized due diligence
- Limited design options
- Time-consuming iterations
- Unknown financial impact
- Stakeholders with differing objectives

80-90%

of project value is created during **pre-development**

Source: Finance for Real Estate Development | Urban Land Institute

Fine-tune the criteria for success across the project lifecycle (360-degree design):

Collaborate from the start.
Reduce risk of surprizes and accelerate decision-making.

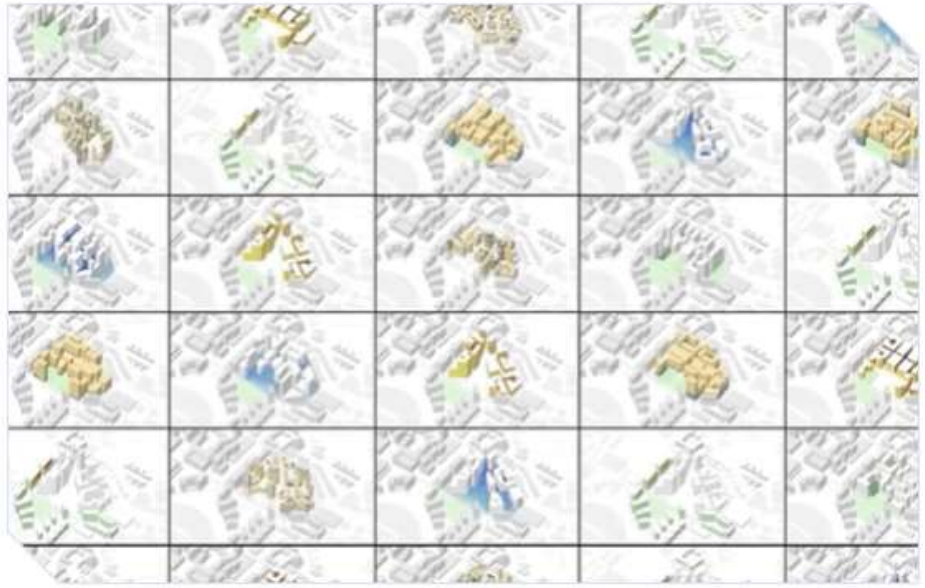
Save time and move fast.
Augment complex design processes with machine learning.

Uncover the best design, every time.
Test multiple scenarios, and get quick answers.

Increase financial returns.
Optimize financial outcomes by intentionally designing for value.

Lay the foundation for operational excellence.
Establishing the data and digital startegy to unlock the power of the digital twin.

Design for Future State.
Integrate user journey design for digital services and planned revenue diversification.



De-risking and Accelerating Project Submission and Real-Time Zoning

What if Town of Oakville was able to validate or co-create the best use of land that is contextually appropriate, and **incentivize the right kind of development?**

Applications for Municipal Governments

Applications for Municipal Governments

KEY FINDINGS & CONSIDERATIONS

The plethora of new and emerging technologies in the architecture, engineering, construction, and owner space can provide a huge benefit to municipalities like Oakville when it comes to reimaging their Property Development Services.

Effectively digitizing Oakville's Property Development Services can unlock numerous opportunities for the town, including:

- Advanced, fully-integrated electronic development approval systems to reduce review time and automate tedious administrative tasks
- The adoption of Building Information Modelling (BIM) to promote collaboration - internally and externally - in the review process and automate certain time-consuming checks to drive efficiencies.
- Remote and virtual inspection opportunities to better capture the as-built building and ensure compliance
- City Information Modelling adoption through the integration of BIM and GIS to allow for the analysis of development approval applications (in BIM) within the location specific context of the project (in GIS)

QUESTIONS FOR EXPLORATION

1. How can these opportunities be incorporated into property development services' processes?
2. How can the Town best leverage these tools to provide additional insight into property development applications?

Electronic Development Approvals Systems

Incorporating Technology in the Development approval

Spurred by COVID19, Electronic Development Approvals are becoming more common across Ontario and Canada.

Research in this space has identified three levels of electronic development approvals ranging from basic permitting (where functionalities include the submission, intake, circulation, review of development applications) to more advanced systems that integrate with building information models and geographic information system tools to promote the development of city information models.

There are many tools in this space and they each offer a combination of many potential functionalities of Level 1 e-permitting. Oakville has already adopted a portal and back-end to facilitate the transition to Level 1 and is currently procuring a document circulation tool to complete that transition.

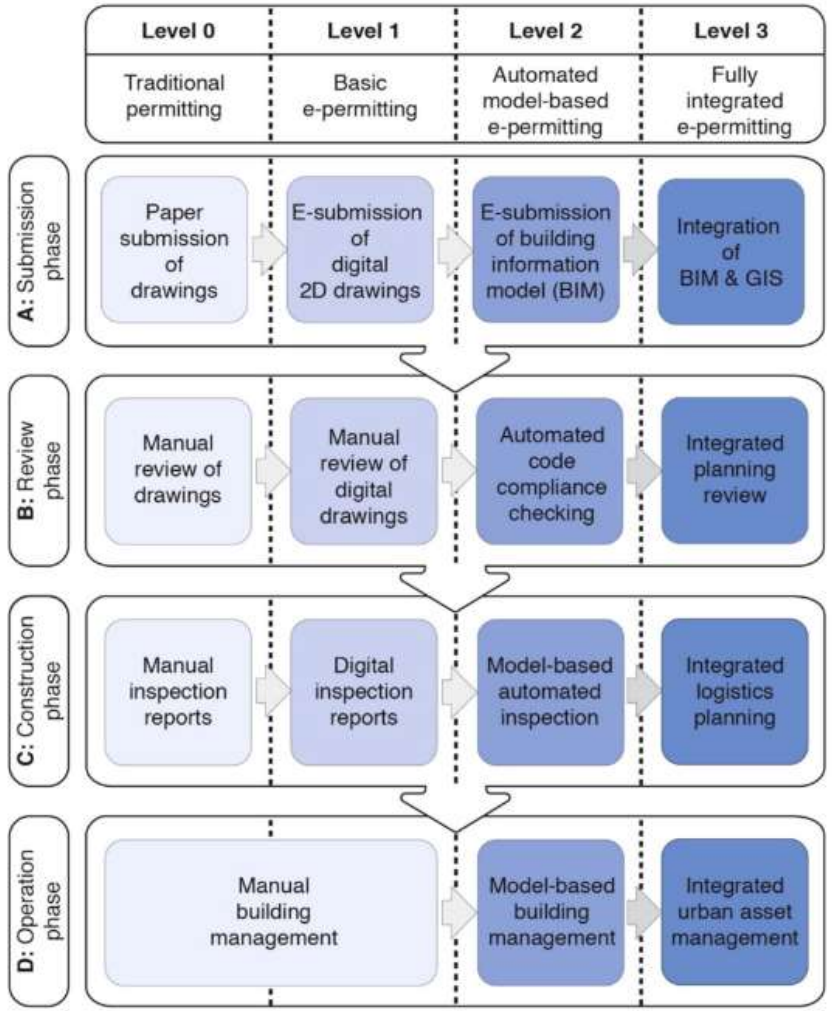
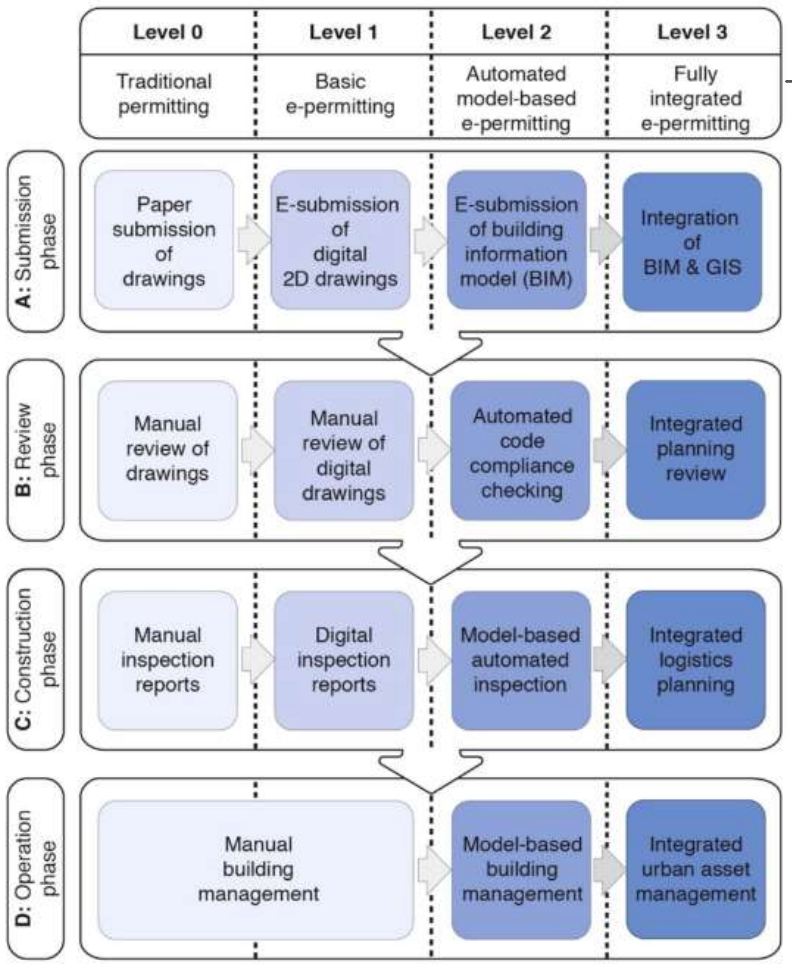


Image Source: Evaluation of Tall Building Construction Permitting Process in Toronto
K. Shahi, B. Y. McCabe, A. Shahi, P. De Berardis, R. Lyall

Levels of Electronic Development Approvals

Oakville is here



Level 0: Paper-Based Approvals

Level 1: Basic Digital Approvals

Level 2: BIM-Based Approvals

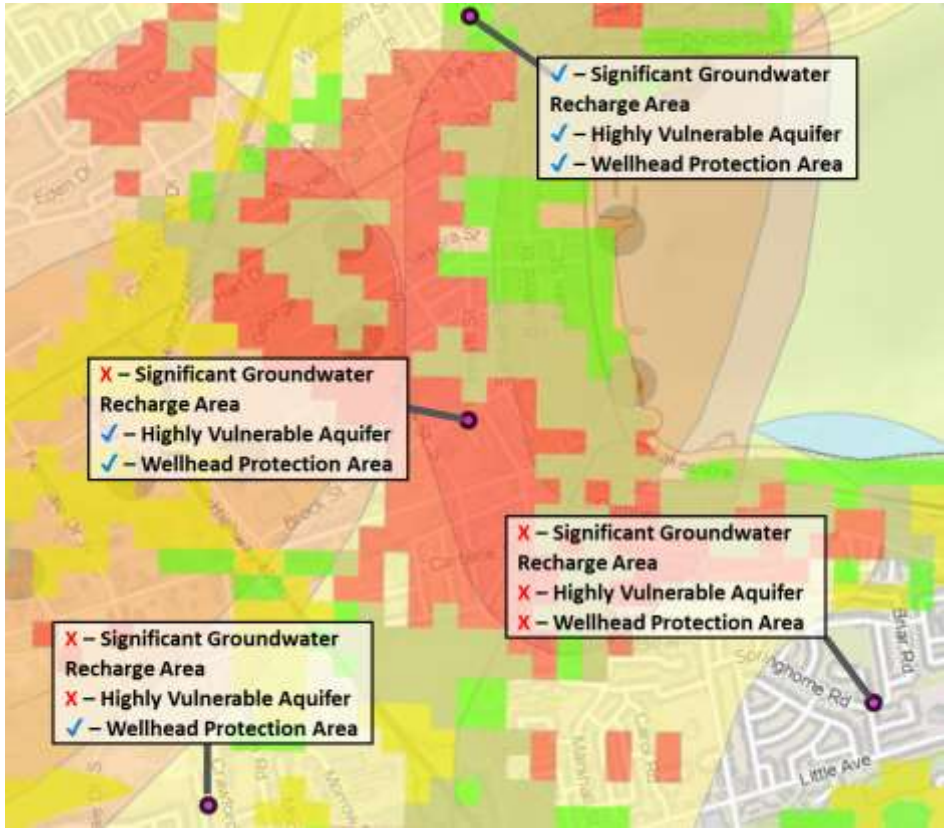
Level 3: BIM/GIS Integrated Approvals

Electronic Development Approvals Systems

Incorporating Technology in the Development approval

Even at Level 1 e-permitting, the systems can be enhanced with a variety of tools to improve efficiencies and customer experience:

- Virtual Assistants and chatbots to aid applicants in submitting their applications.
- Mobile tools to allow for applicants, reviewers, and inspectors to connect to the system from anywhere.
- Notification systems, including through SMS to notify applicants and staff when key activities are underway or completed.
- Public facing GIS applications to applicants to access information (such as zoning, official plan designations, conservation areas, etc.) based on the location of their project.
- Artificial intelligence and machine learning to review applications, processes, and results to identify trends in the data to provide users with suggestions.



What is BIM? Building Information Model/Modelling/Management

Model

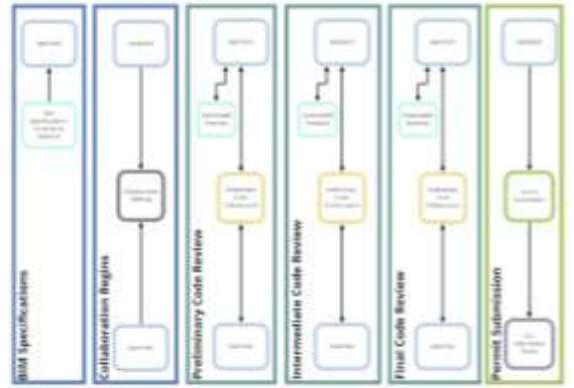
Is the **DIGITAL REPRESENTATION** of physical and functional characteristics of a facility, a shared knowledge resource for information about a facility. Authoring tools such as Revit, ArchiCad, Tekla, Bentley, etc

Modeling

Is a **PROCESS** for leveraging building data to design, construct and operate the building during its lifecycle. BIM allows all stakeholders to have access to the same information through interoperability between different technology platforms.

Management

Is the **ORGANIZATION & CONTROL** of the process by utilizing the information in the digital prototype to effect the sharing of information over the entire lifecycle of an asset, effectively developing an asset lifecycle process and model from conception to retirement.



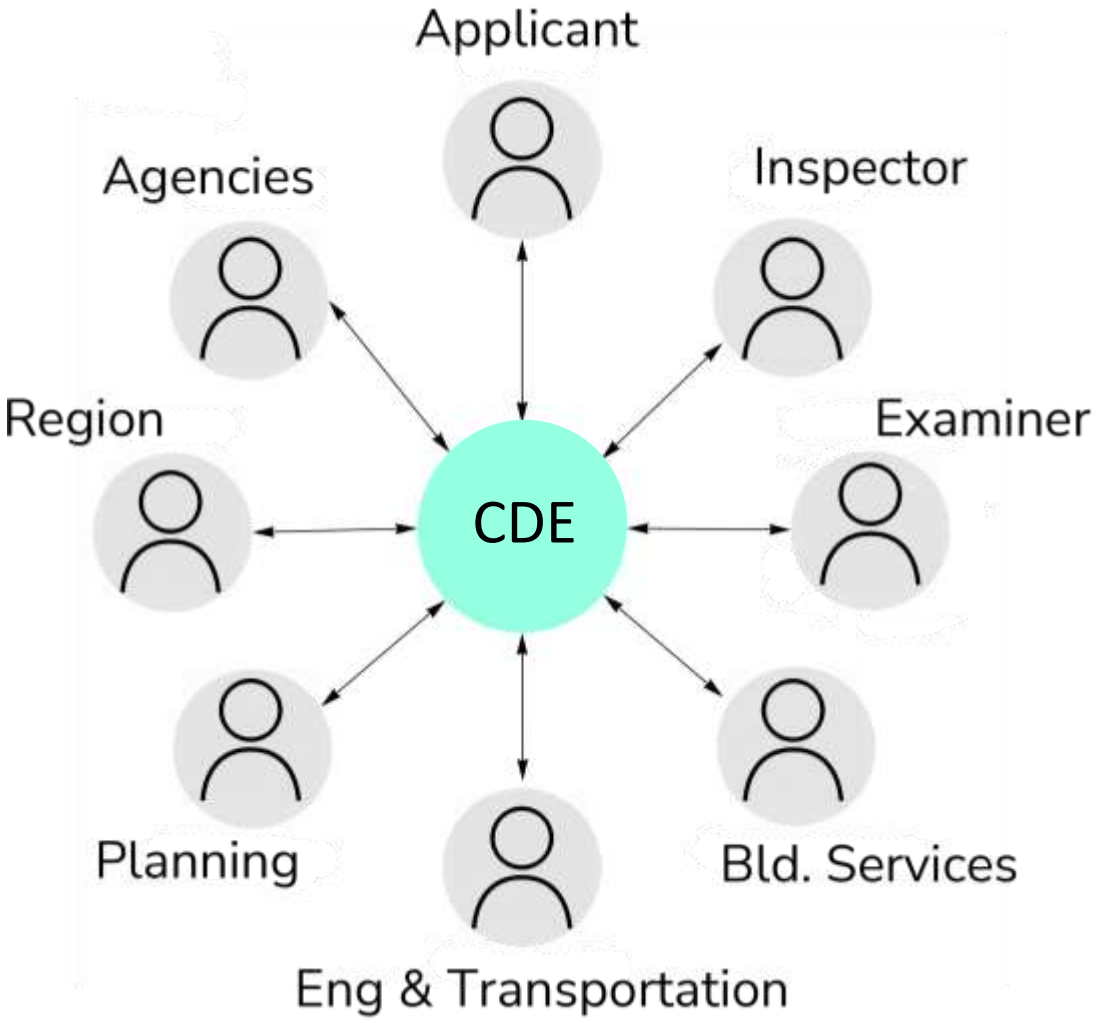
BIM Collaboration

Reimaging Processes

Current processes rely on back-and-forth conversations between a multitude of stakeholders involved in the development approval process.

BIM encourages the use of a common data environment (CDE) to centralize all communications regarding a project. For development approvals, this would bring together all the key players – Town staff, external agencies, and the applicant – to work on the same set of drawings and models.

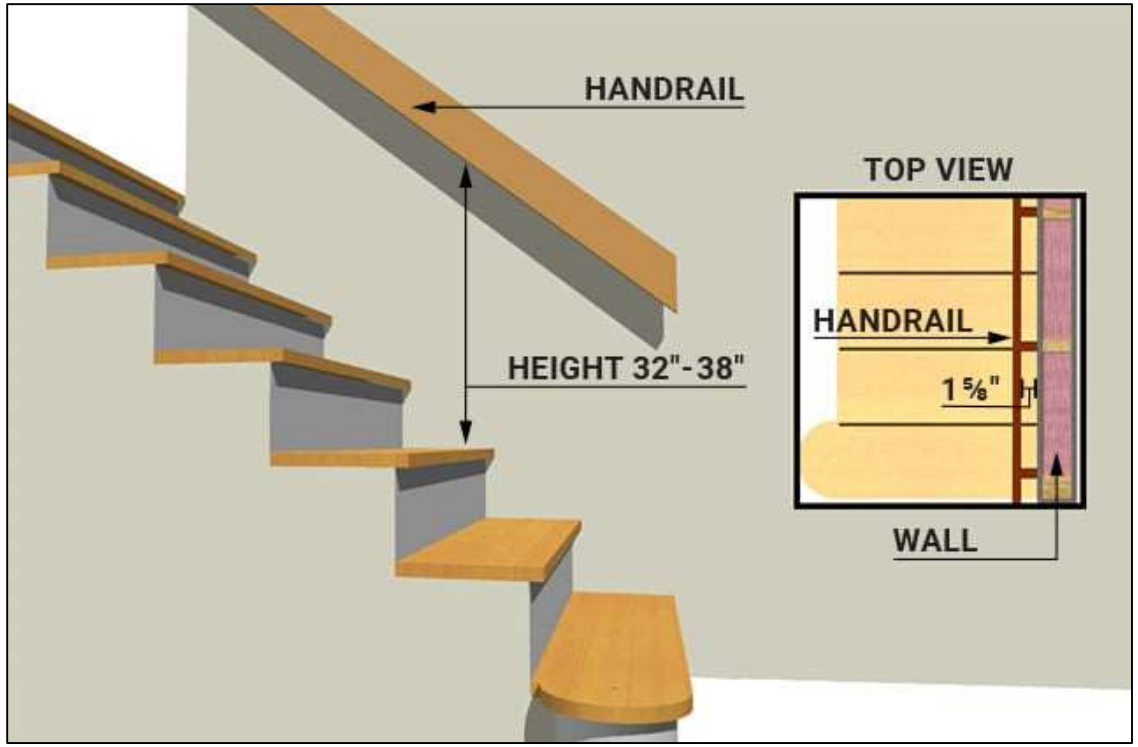
This allows for real-time communication. For example, one reviewer can mark an issue on the model, and all other parties would be able to see that issue, comment on it, and work together to resolve it.



BIM Code Checking Possibilities

Automated Code Compliance Checking

Certain building code checks can be automated in BIM – particularly those that do not require a reviewers subjective expertise. For example, the height and spacing can be checked automatically for stairs, allowing reviewers to focus their attention on more challenging checks.



Building Code – Ontario 3.4.6.5

4) The height of handrails on stairs and ramps shall be measured vertically from the top of the handrail to,
   a) A straight line drawn tangent to the tread nosings of the stair served by the handrail, or
   b) The surface of the ramp, floor or landing served by the handrail.

5) Except as provided by Sentences (6) and (7), the height of handrails on stairs and ramps shall be,
   a) not less than 865 mm, and
   b) not more than 965 mm.

Building Information Model (BIM) – Compliance Checking Rule

```
VerticalDistance = top_surface(handrail) – top_surface(step);

if( VerticalDistance >= 865mm and VerticalDistance <= 965mm )

                Compliance = true;
else
                Compliance = false;
```

BIM / UAV Inspection Possibilities

Building Inspections in BIM/VR

With Unmanned Aerial Vehicles (UAV), building inspections can be enhanced, allowing for the digital documentation of the building. This will allow inspectors to digitally record deficiencies and allow for access to areas that would not be accessible if done by a traditional inspection

Infrastructure Maintenance in BIM/VR

UAVs can also aid in identifying deficiencies in existing assets, for example, checking the underside of a bridge deck or parking garage.

BIM / GIS Integration Possibilities

Zoning Checks

BIM files can be uploaded to the Town, put into their proper location in GIS, and then automatically checked against what zoning permits in the space.

The regulations for *lots* in a Residential *Zone* are set out in Tables 6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.6, 6.3.7, 6.3.8, and 6.3.9, below.

Table 6.3.1: Regulations in the Residential Low RL1, RL2, RL3, RL4, RL5, and RL6 Zones

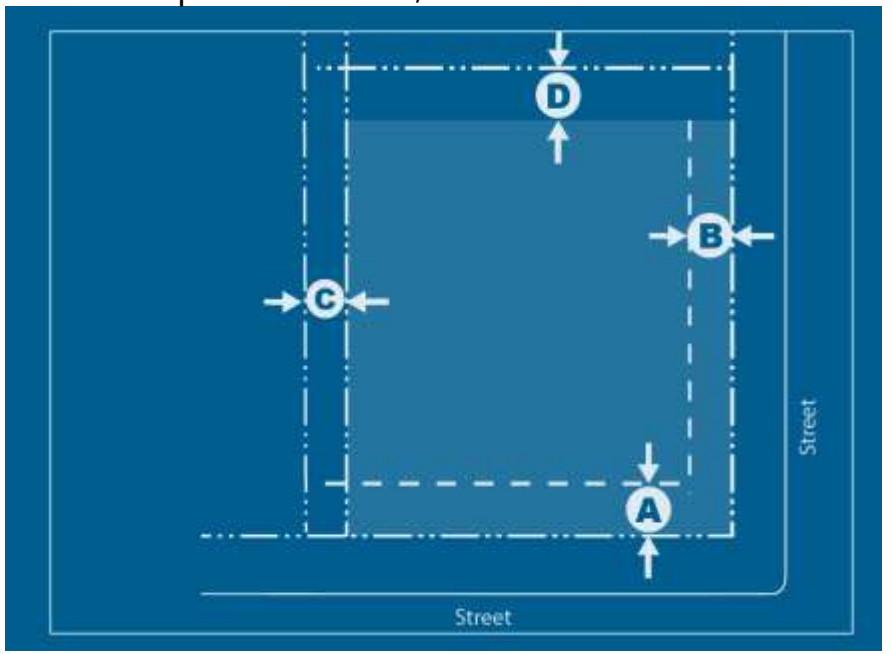
	RL1	RL2	RL3	RL4	RL5	RL6
Minimum *lot area*	1,393.5 m² (2)	836.0 m² (2)	557.5 m² (2)	511.0 m² (2)	464.5 m² (2)	250.0 m² (3)
Minimum *lot frontage*	30.5 m (2)	22.5 m (2)	18.0 m (2)	16.5 m (2)	15.0 m (2)	11.0 m (3)
Minimum front yard A	10.5 m (-0)	9.0 m (-0)	7.5 m (-0)	7.5 m (-0)	7.5 m (-0)	3.0 m
Minimum flankage yard B *(2016-013)*	4.2 m	3.5 m	3.5 m	3.5 m	3.5 m	3.0 m (8)
Minimum interior side yard C	4.2 m	2.4 m (4)	2.4 m and 1.2 m (5)	2.4 m and 1.2 m (5)	2.4 m and 1.2 m (5)	1.2 m and 0.6 m
Minimum rear yard D	10.5 m	7.5 m (6)	7.5 m (6)	7.5 m (6)	7.5 m (6)	7.0 m (6)
Maximum number of *storeys*	n/a (-0)	n/a (-0)	n/a (-0)	n/a (-0)	n/a (-0)	2
Maximum *height*	10.5 m (-0)	12.0 m (-0)	12.0 m (-0)	12.0 m (-0)	12.0 m (-0)	10.5 m
Maximum *dwelling depth*	20.0 m (1)	n/a	n/a	n/a	n/a	n/a
Maximum *residential floor area ratio* *(2017-025)*	n/a (-0)	n/a (-0)	n/a (-0)	n/a (-0)	n/a (-0)	75% (7)
Maximum *lot coverage* for the *dwelling* *(2017-025)*	30% (-0)	30% (-0)	35% (-0)	35% (-0)	35% (-0)	n/a

Zoning By-law Checks

Setbacks for Residential

GIS – Compliance Checking Rule

```
if( BoundingBox(BIM).width <= Lot.width-(B+C) and
BoundingBox(BIM).height <= Lot.height-(A+D)
        Compliance = true;
else
        Compliance = false;
```



BIM / GIS Analysis

BIM/CIM Analysis

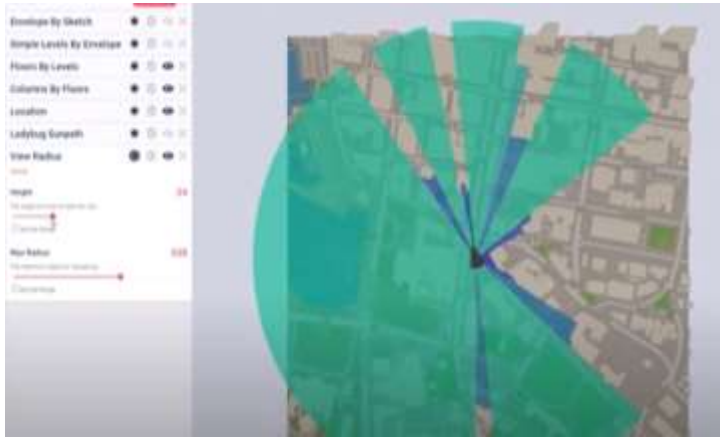
With BIM, GIS, and CIM, there is an almost infinite number of new opportunities that are unlocked.

The Town would be able to review how the proposed development interacts with the existing buildings and infrastructure – for example:

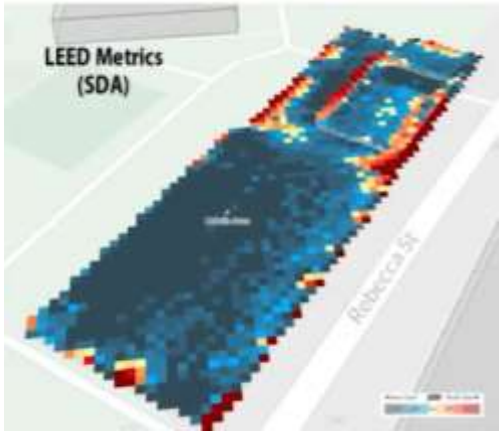
- Determining where shadows are going to fall
- Reviewing expected energy consumption
- Simulating the effect on local transportation, water, and sewage infrastructure

The results of this analysis can then be used to inform decision making.

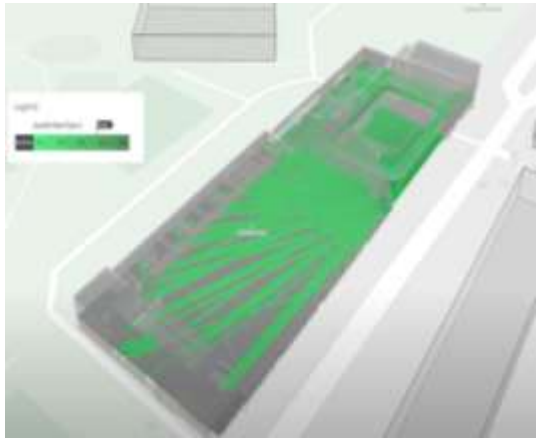
Sunlight Analysis



Energy / LEED Analysis

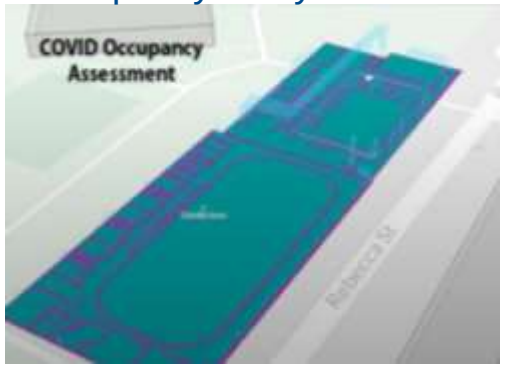


Sky / Context View Analysis

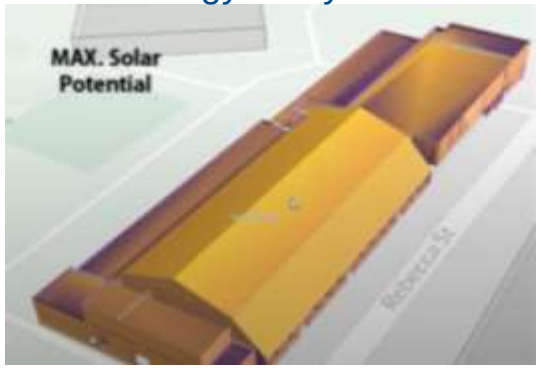


Shadow Analysis

Occupancy Analysis



Solar Energy Analysis



What is Happening in Canada?

The Canadian Development Approval Technology Landscape

KEY FINDINGS & CONSIDERATIONS

Canada has typically lagged in adopting technology in the property development space, but there are some efforts to bring the benefits of modern technology to municipalities.

COVID19 drastically changed the landscape in this space – municipalities and regulatory agencies were quickly forced to adopt tools that allowed employees to work from home throughout the pandemic and minimize physical interactions between staff, applicants, and other stakeholders. This resulted in numerous municipalities adopting e-permitting systems that allowed for the intake of applications.

This is where many municipalities are currently stuck; they have an e-permitting tool, a back-end, and some have additional mark-up or document circulation tools, but they do not have a way forward to adopt more advanced technologies like BIM to truly transform their property development processes.

QUESTIONS FOR EXPLORATION

1. How can Oakville leverage work done by other Canadian jurisdictions to modernize their property development services?
2. Does Oakville want to lead in this space?

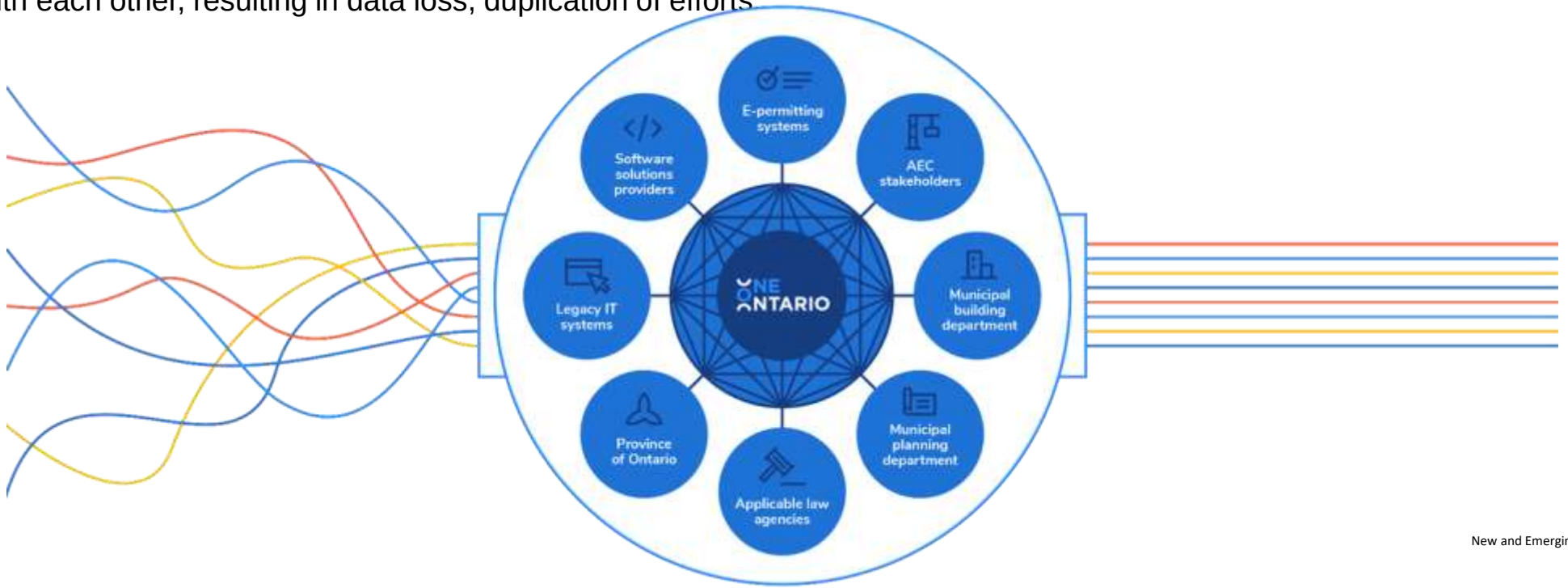
Efforts to Modernize Development Approvals – One Ontario

Streamlining and Centralizing Processes

The One Ontario coalitions consists of approximately 40 organizations representing building officials, planners, government IT staff, municipalities, builders, engineers, and other stakeholders involved in the property development process.

One Ontario aims to address the challenges within the development process – stakeholders are using many different systems that do not communicate with each other, resulting in data loss, duplication of efforts and delays in processing applications.

The goal is to develop a single source of truth that allows all requirements from all stakeholders to be captured up front, and create connections between all stakeholders to ensure everyone is working from a single source of truth. This initiative will enhance collaboration between all groups and will result in reduced redundancies and inefficiencies, resulting in faster decisions.



BIM Efforts in Canada – buildingSMART Canada Municipal Infrastructure Council

buildingSMART Canada

buildingSMART Canada is committed to supporting the digitalization of Canada's built asset industry by developing and helping promote the adoption of open, international standards and solutions. buildingSMART Canada is the community for visionaries working to transform the design, construction, operation, and maintenance of Canada's built environment.

buildingSMART Canada

The Municipal Infrastructure Council (MIC)

Municipalities must play an integral part in the adoption of BIM and BIM Standards in Canada. As major stakeholders of infrastructure (buildings and linear) they must act as the driving force for BIM adoption in Canada, particularly in linear asset management. As such, a coordinated effort is necessary to engage municipalities and strategic infrastructure stakeholders in driving the implementation of BIM and its adoption, policy, and standards, in Canada.

MIC is a collaborative and innovative program to engage municipal infrastructure stakeholders and their respective senior, mid-management, and technical level personnel in advocacy, policy and regulatory councils, and infrastructure room activities that will form the basic platform to drive BIM adoption in Canada. The program is designed to address identified and specific targeted project requirements within municipalities, and lever internal and external resources, budgets, and funding options.

MIC Municipalities include:

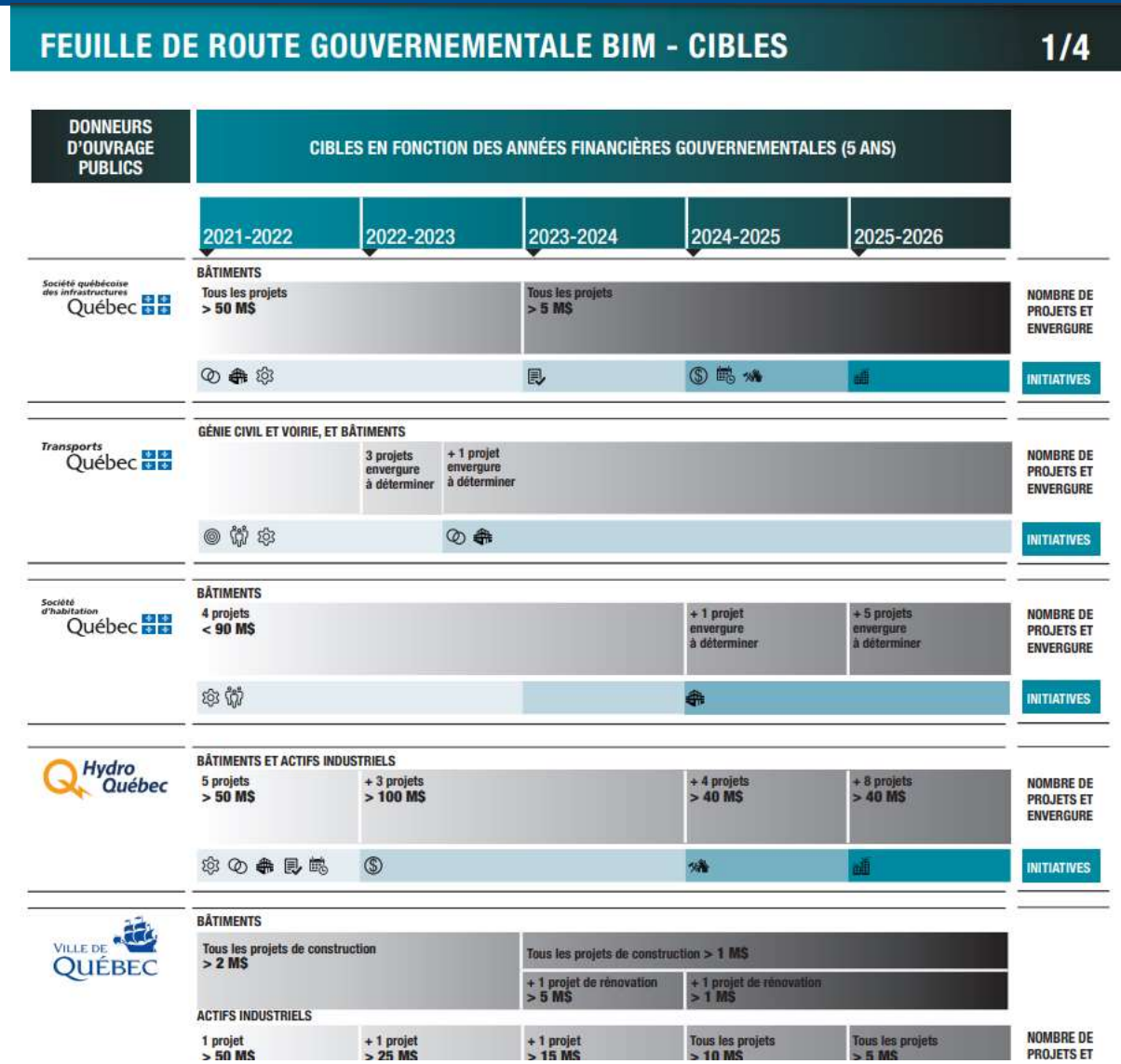
- Calgary
- Kingston
- Quebec City
- Halifax

BIM Efforts in Canada – Quebec Provincial Government

Provincial Mandate for Government Projects

In August 2021, the Government of Quebec introduced a roadmap for the use of BIM throughout it's various ministries/departments (SQI, MTQ, SHQ, and Hydro-Quebec) as well as the municipalities of Montreal and Quebec City, This initiative was to accelerate the digital shift in the construction industry in Quebec and in turn increase productivity.

$13.7 million dollars was spend to carry out diagnostics and draft implementation plans to modernization approximately 100 major public sector organizations as well as 350 companies in the AEC sector.



Gouvernement du Québec

BIM Efforts in Canada – Alberta Infrastructure

Provincial Mandate for Government Projects

In March 2018, Alberta Infrastructure (AI), responsible for building and managing infrastructure in Alberta, introduced a series of BIM requirements for consultants to follow. AI managed a portfolio of 2,000 buildings and is involved in hundreds of projects every year.

AI's requirements are based on COBie - Construction Operations Building Information Exchange. This format is focused on delivering asset data from the BIM, and is essentially a spreadsheet that contains all the information generated during the design and construction phases of a projects for future use in the operations phase. This was selected as the format to simplify data capturing – previously this information would be found in various drawing schedules and forms.

Alberta Infrastructure BIM Consultant Requirements

Table of Contents

Alberta Infrastructure

CIM / Digital Twin Efforts in Canada

Examples of how some are using CIM and Digital Twins

CIM is being used in a few municipalities throughout the country.

The City of Toronto has a 3D massing model creating in SketchUp that is used for developing signage for development approval applications. Applicants upload a model with a low level of detail into the City Information Model to identify where the project is and how it relates to neighbouring buildings.

The City of Ottawa is working to create a true digital twin of the City. As of 2021, a strong foundation for the work had been put in place by the Surveys and Mapping and the Geospatial Analytics, Technology and Solutions teams, and this work will be further enhanced for visual and numerical analysis in the building of the City's new zoning bylaws.


City of Toronto

City of Ottawa

Jurisdictional Scan: Where is Industry at with BIM?

KEY FINDINGS & CONSIDERATIONS

Many architecture, engineering, and construction companies who do business in Oakville are excited to see how digitization and service modernization can enable new opportunities and faster approvals:

- Automating certain portions of the process to provide instant feedback (for example, through automated code compliance checking on submission).
- The ability to track the status of an application and communicate for effectively with the Town and other agencies.
- Receiving more consistent feedback from the Town and other commenting agencies to better address concerns in a timely manner.

BIM is commonplace is most architecture firms, large scale projects are being created using BIM in Oakville – for example, the Trafalgar Park Community Centre.

- BIM is also being done on some low-rise developments in Oakville.

Surveys on the use of BIM from the University of Toronto indicate that 82% of respondents are using BIM for projects.

QUESTIONS FOR EXPLORATION

1. What can the Town do to ensure industry is educated and kept up to date on new requirements and standards?
2. How can the Town aid those who are having difficulty in meeting the new requirements?

International Examples

Jurisdictional Scan: What Others are Doing

KEY FINDINGS & CONSIDERATIONS

Canadian municipalities and associated regulatory agencies are generally behind the curve when it comes to the adoption of technology in the property development space.

Numerous international jurisdiction have begun their digital transformation over the past 20 years. These jurisdictions, while not perfectly applicable to Oakville due to the differences in the political and regulatory landscape, the technologies and the processes that they have implemented are agnostic to these external factors, and these jurisdictions still demonstrate what is possible from a technology and process standpoint in this space.

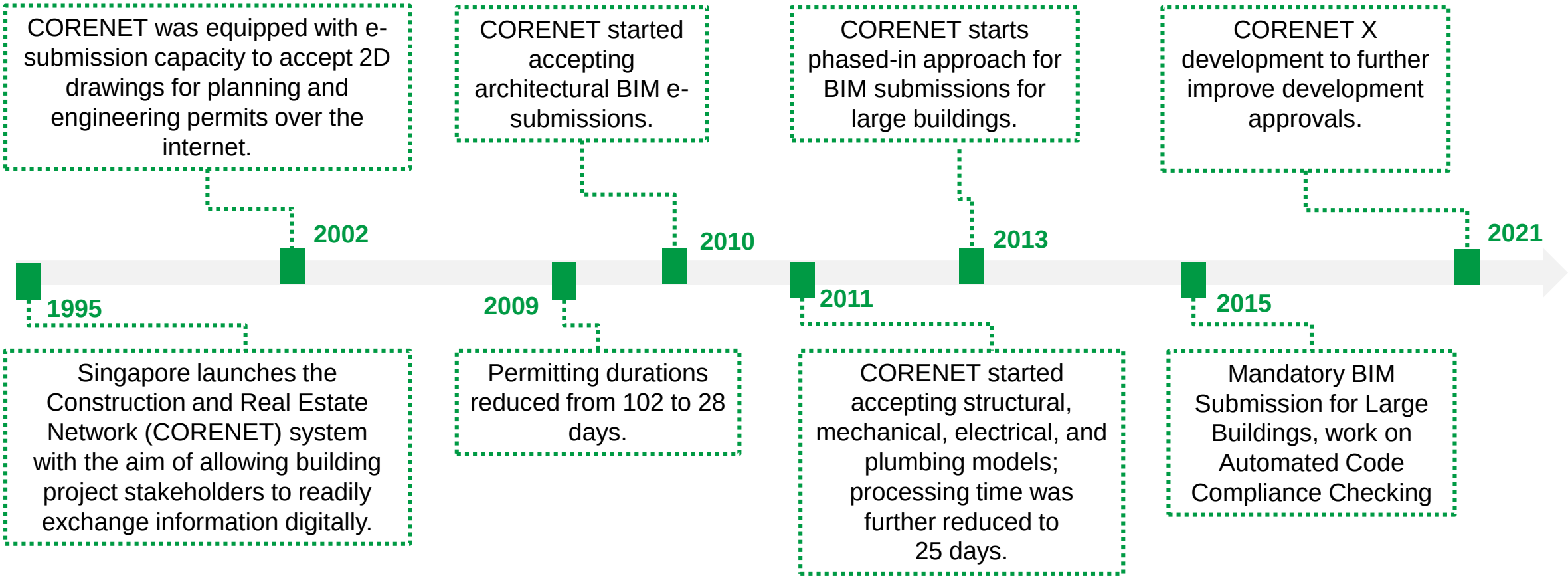
Some of these leading jurisdictions that will be explored in the following slides include:

- Singapore
- United Kingdom
- Dubai (U.A.E.)
- Estonia
- Norway
- Milan (Italy)
- South Korea
- Japan

QUESTIONS FOR EXPLORATION

1. Who does the Town want to replicate?
2. How does the local political landscape impact the potential adoption of systems in international jurisdictions?

Singapore - CORENET



Singapore - CORENET

What is CORENET?

- CORENET is Singapore's **one-stop shop** for the electronic submission to the Building and Construction Authority and the 15 other government regulatory agencies.
- The system provides **all codes and regulations**.
- They became the first government body in the world to **adopt BIM submissions**.
- Singapore is the **fastest** in the world in issuing construction permits, and one of the most business-friendly economies.

What were the Success Factors?

- **Getting buy-in** from key stakeholders – a committee was set up to address agency and applicant concerns.
- **Building industry capability** – three-year phase in period before mandatory submissions were required.
- **Close monitoring** and **regular dialogue** with key stakeholders.
- Robust submission **guides**, and **templates/standards** for CAD, and BIM.

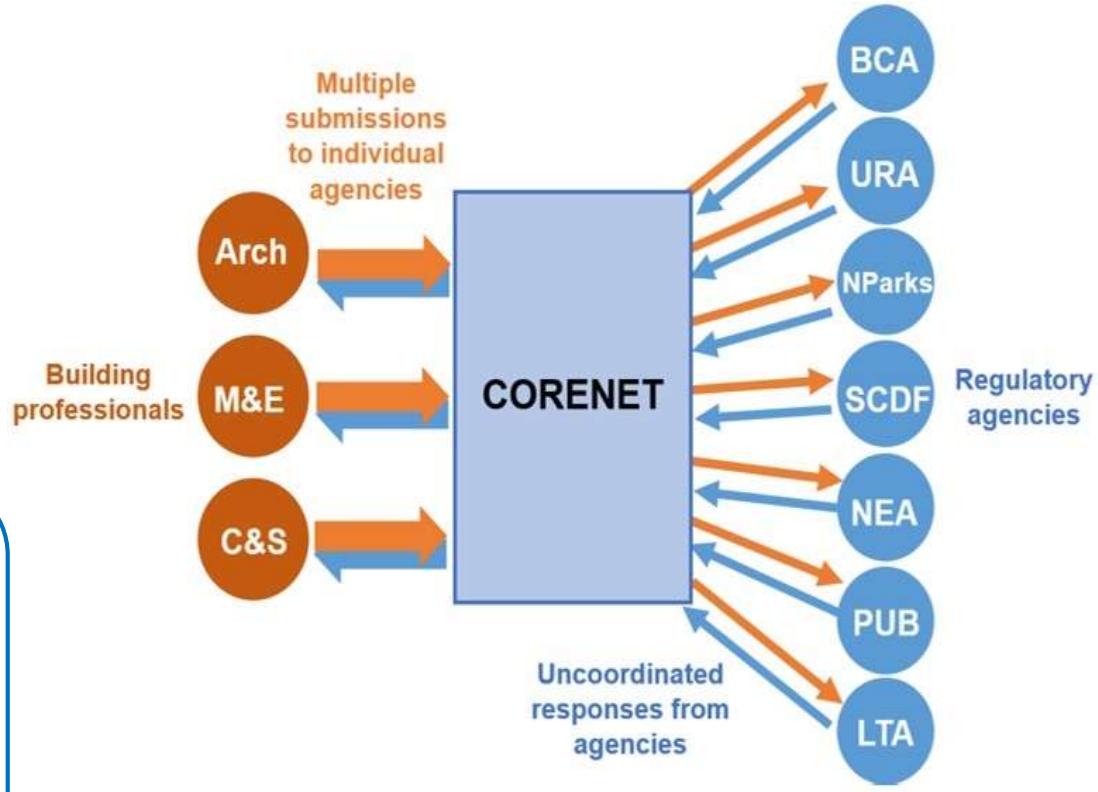
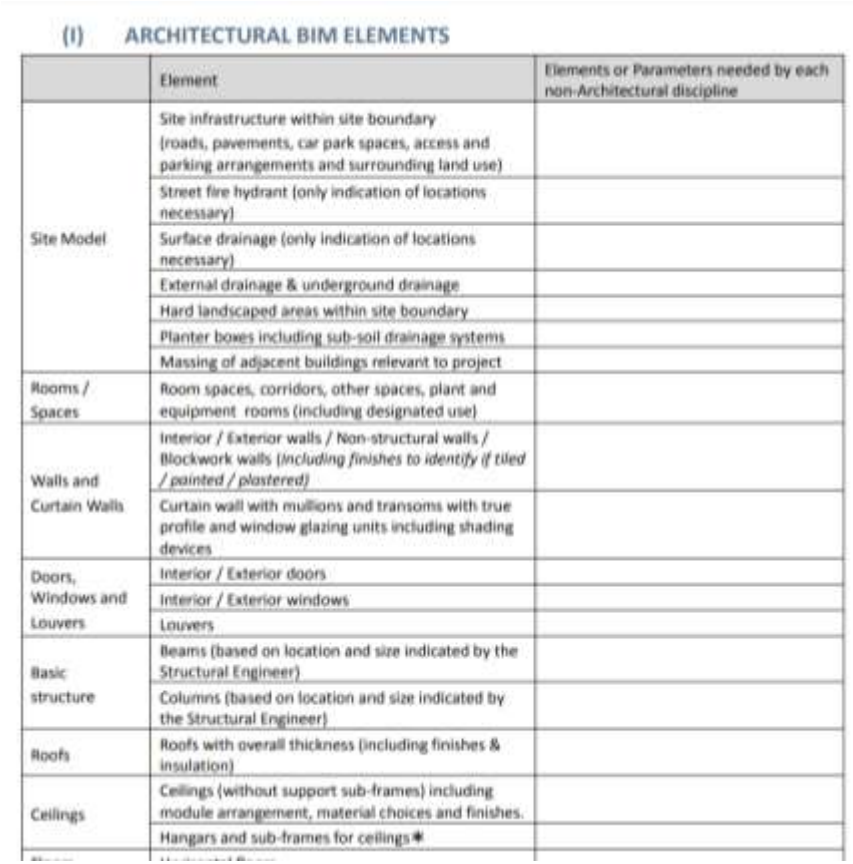


Image from CORENET website

Singapore - CORENET

Source: CORENET website



(I) ARCHITECTURAL BIM ELEMENTS

	Element	Elements or Parameters needed by each non-Architectural discipline
Site Model	Site infrastructure within site boundary (roads, pavements, car park spaces, access and parking arrangements and surrounding land use)	
	Street fire hydrant (only indication of locations necessary)	
	Surface drainage (only indication of locations necessary)	
	External drainage & underground drainage	
	Hard landscaped areas within site boundary	
	Planter boxes including sub-soil drainage systems	
	Massing of adjacent buildings relevant to project	
Rooms / Spaces	Room spaces, corridors, other spaces, plant and equipment rooms (including designated use)	
Walls and Curtain Walls	Interior / Exterior walls / Non-structural walls / Blockwork walls (*including finishes to identify if tiled / painted / plastered)*	
	Curtain wall with mullions and transoms with true profile and window glazing units including shading devices	
Doors, Windows and Louvers	Interior / Exterior doors	
	Interior / Exterior windows	
	Louvers	
Basic structure	Beams (based on location and size indicated by the Structural Engineer)	
	Columns (based on location and size indicated by the Structural Engineer)	
Roofs	Roofs with overall thickness (including finishes & insulation)	
Ceilings	Ceilings (without support sub-frames) including module arrangement, material choices and finishes.	
	Hangars and sub-frames for ceilings*	

- In conjunction with BIM submission, Singapore released a series of guides to aid industry in meeting the requirements
- These guides elaborate on what BIM is, how BIM is used at various stages of a project, best practices for using BIM, possible deliverables, roles and responsibilities, BIM Execution Plans, and common BIM objects.

Singapore - CORENET X

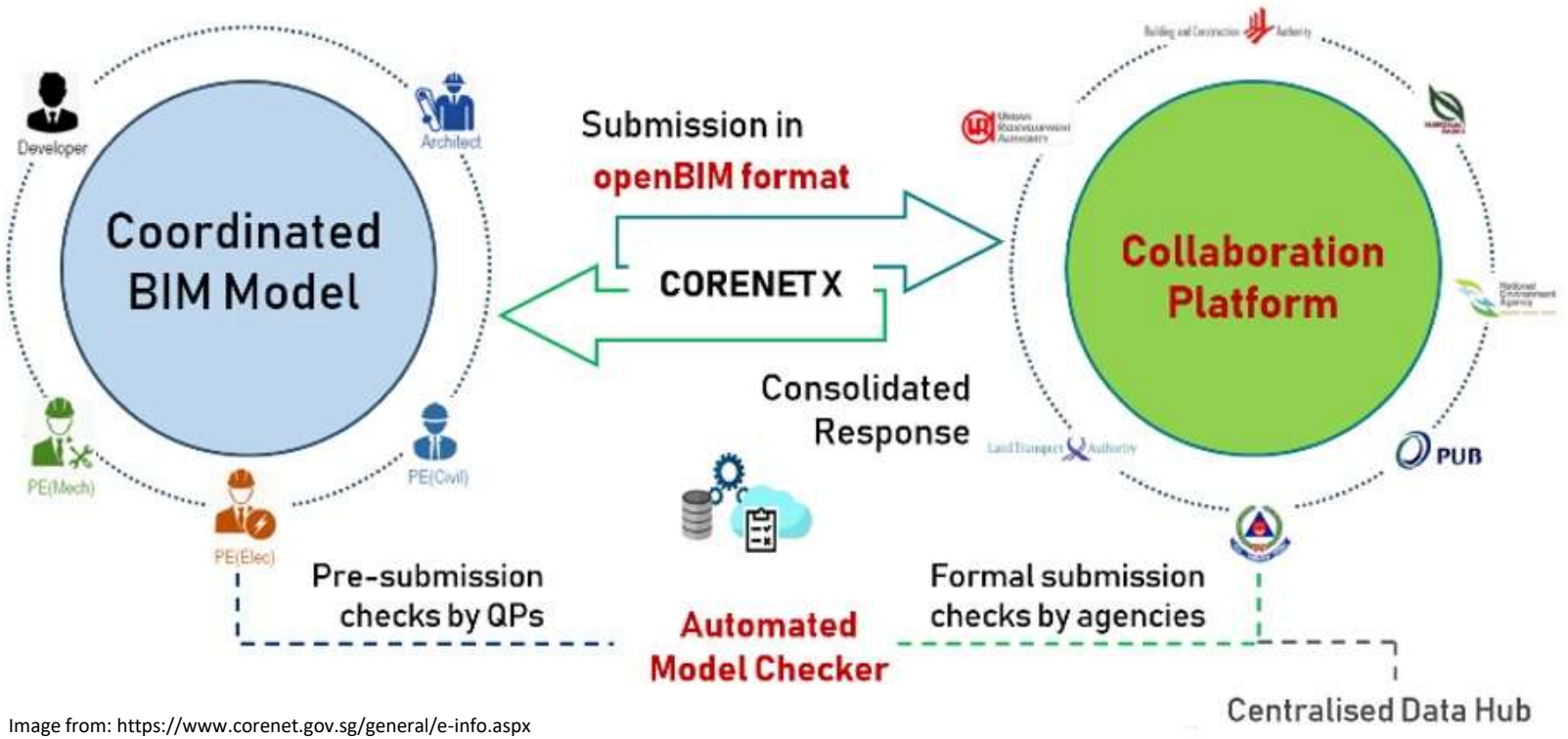
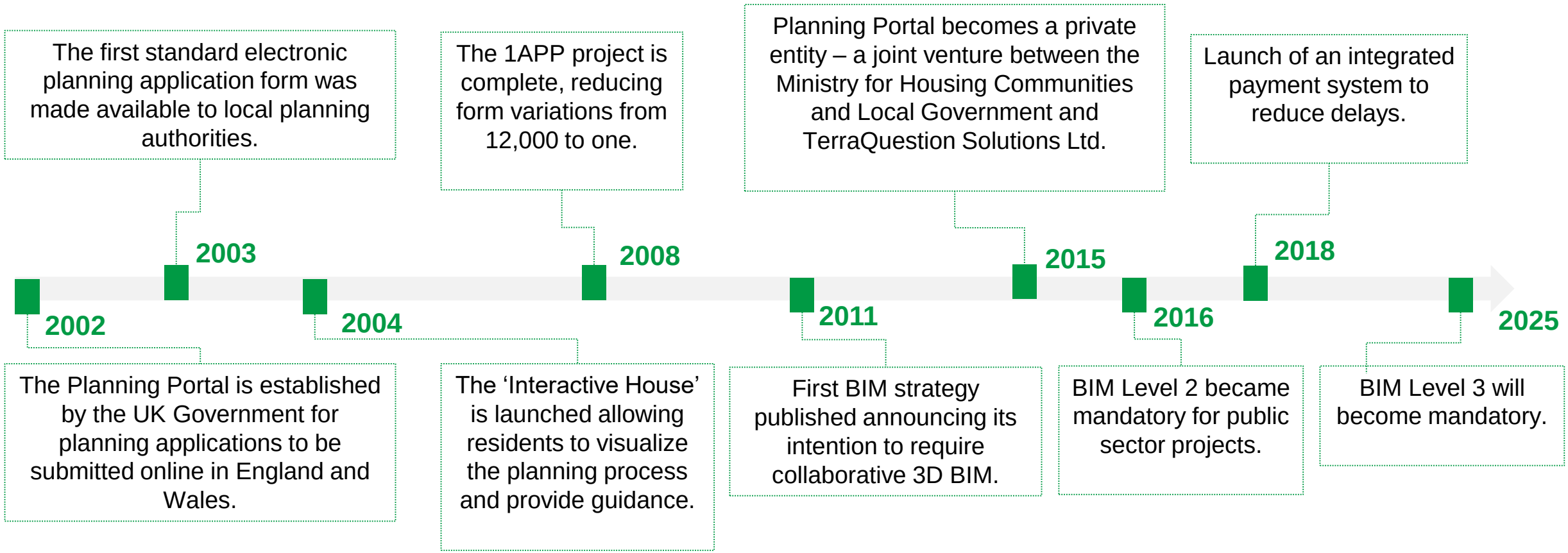


Image from: https://www.corenet.gov.sg/general/e-info.aspx

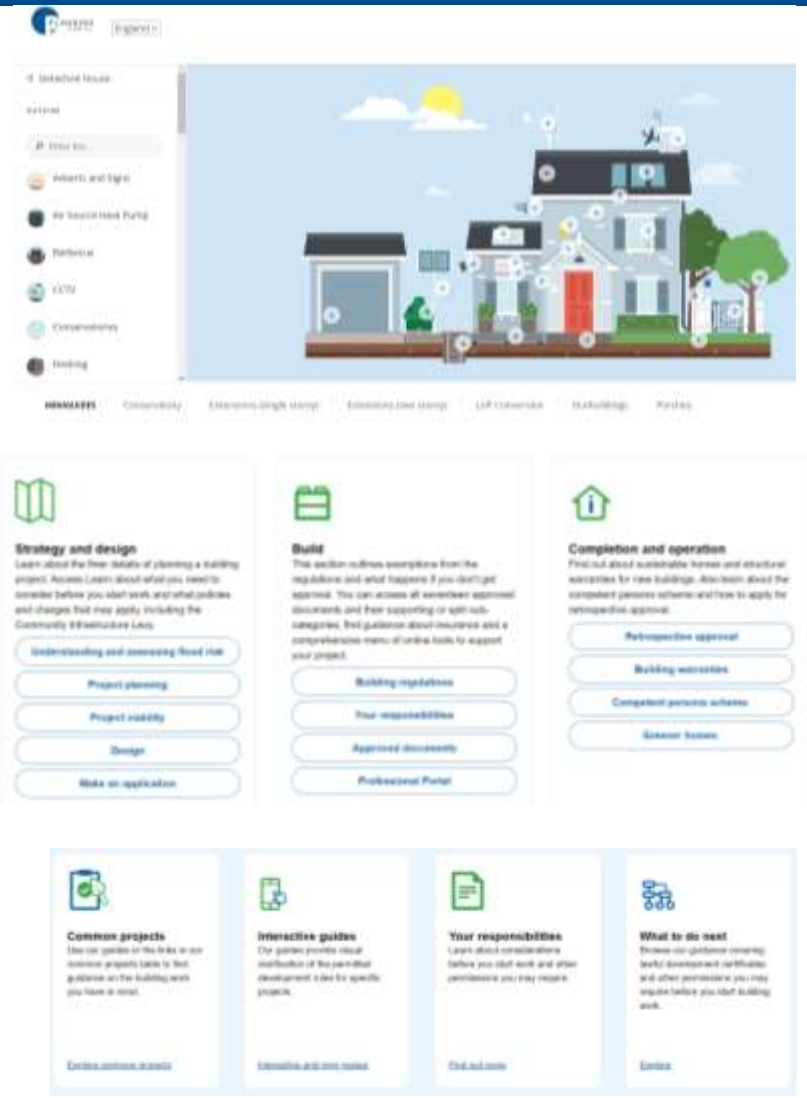
- Debuting in 2023, CORENET X will change how reviews and submissions are conducted – instead of consultants having to dealing with representatives from multiple agencies, a **project team** will come together to produce and submit a **coordinated BIM model** that those agencies will extract the relevant information from to ensure compliance with their respective requirements.
- **Consolidated responses** from the project team will be based on a collective review of the submission by the project team.
- **BIM Submissions** may be expanded to include smaller projects

United Kingdom – Planning Portal and BIM Mandate



United Kingdom – Planning Portal

- The Planning Portal was established to allow planning (and later building) applications in England and Wales to be **processed electronically**.
- Made **information and services simpler** and more **accessible** for applicants, agents, and local authorities alike by working in partnership with all authorities.
- Facilitates communications between the applicant, local planning authority (which oversees conservation and other agencies), and local building authority.
- It is the official electronic source of building regulations **approved documents and forms** required for submission.
- The Portal also provides numerous guidance articles for applicants – including interactive guides for some of the most common household projects.
- It has **directories** of registered and approved planners and inspectors.



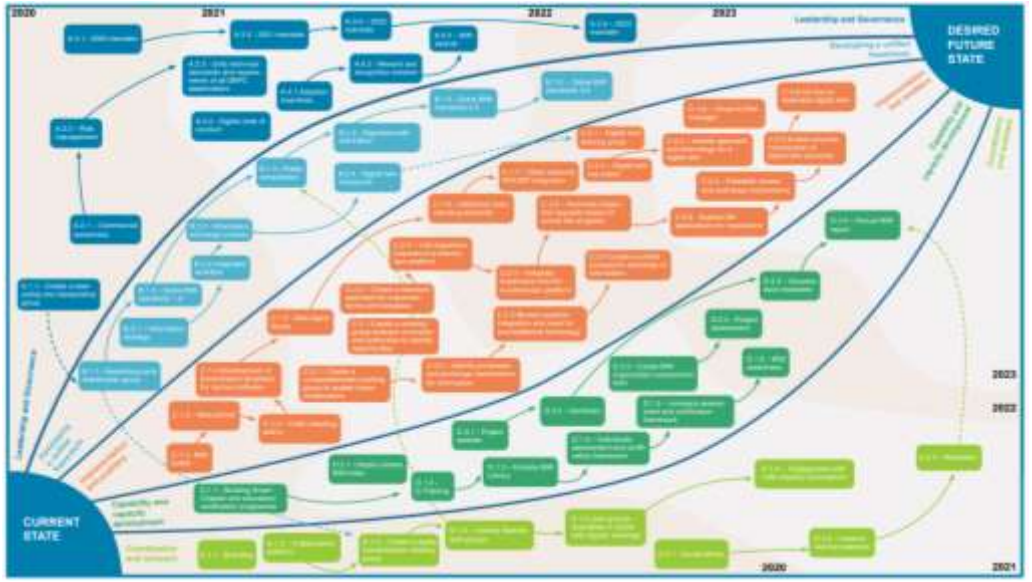
Images from Planning Portal website

United Kingdom – Planning Portal

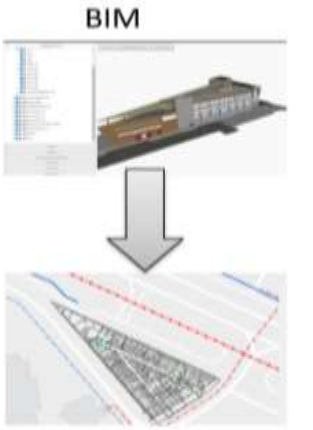
- Announce in 2011 that by 2016 the UK will be adopting BIM ‘Level 2’ for all public sector infrastructure projects.
- Level 1 requires organizations to **define roles and responsibilities** for all stakeholders, **standardize** naming conventions, creation and maintain project-specific **codes and spatial coordination**, adopt a **common data environment** for collaboration, and set up an appropriate **information hierarchy**.
- Level 2 of the **UK BIM Mandate** came into effect in 2016 – this required everything from Level 1 as well as the ability to support common file formats including **IFC** (International Foundation Class) or **COBie** (Construction Operations Building Information Exchange).
- Level 3 will be introduced in 2025.
- Current considerations to make **BIM mandatory for all residential buildings greater than 6 storeys**.
- Documented benefits include cost, time and material savings

Dubai, UAE – BIM Dubai E-Submission Platform

- Dubai got its first **BIM mandate** in 2013.
- In 2019, the Dubai Municipality and the Dubai Building Permit Development Committee commenced a new strategy for **BIM Permits**. This work was done in three parts:
  - A **BIM roadmap**.
  - **BIM standards** for submissions ensure that all inputs into the system were consistent.
  - The **platform** – created in collaboration with Esri and others – launched in 2021 and is **integrated with GIS** to allow for a multitude of planning checks to be completed.
- Work is currently being done to create an **integrated 2D and 3D digital twin** of the city.
- A series of **guides and templates** are available for applicants and agents.
- Construction phase includes the use of **VR for inspections** and **as-built capture** in BIM to input into the GIS-based model.



Setbacks check

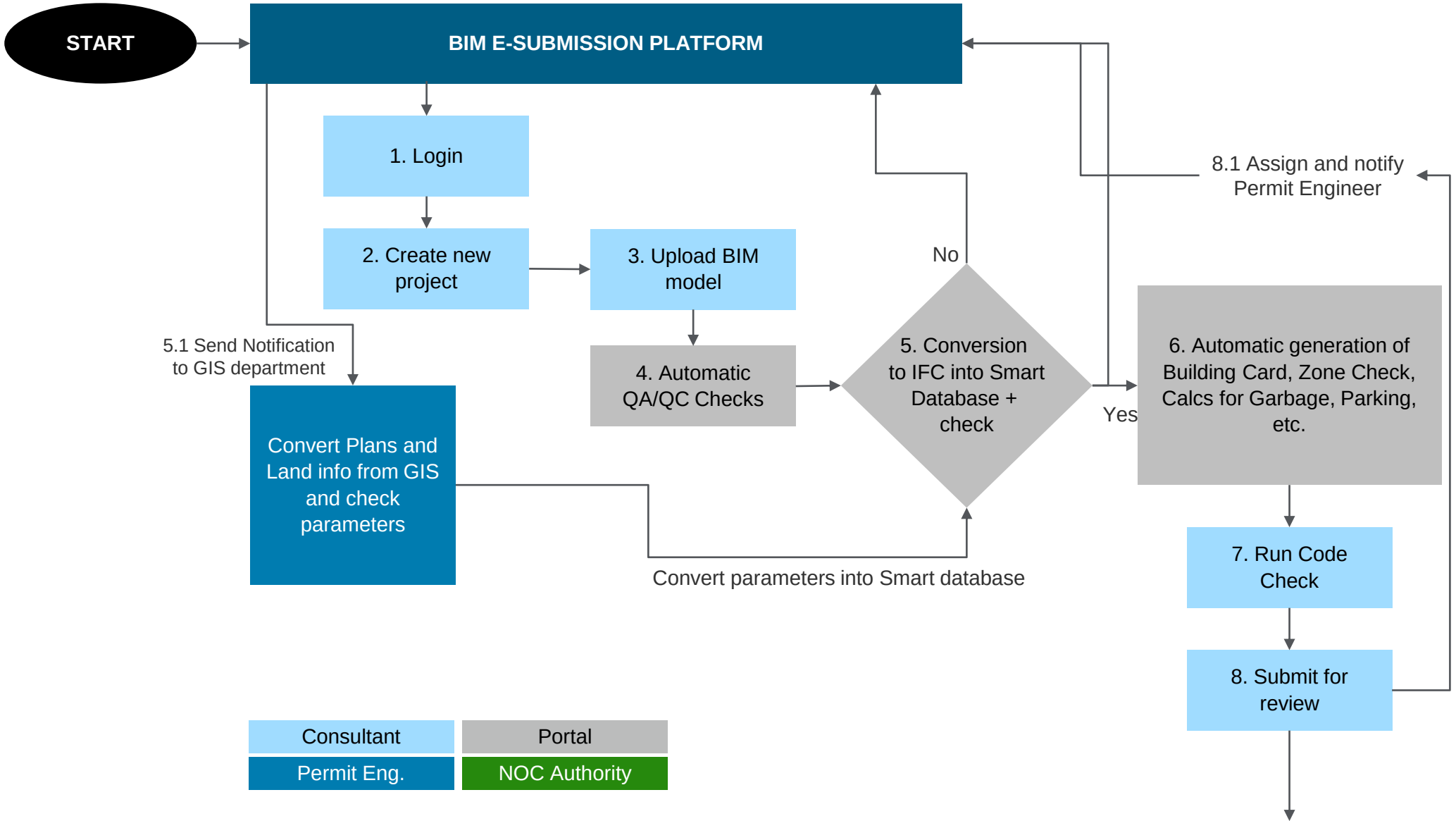


3D Building GIS model

Content from 2021 BIM eSubmission Presentation

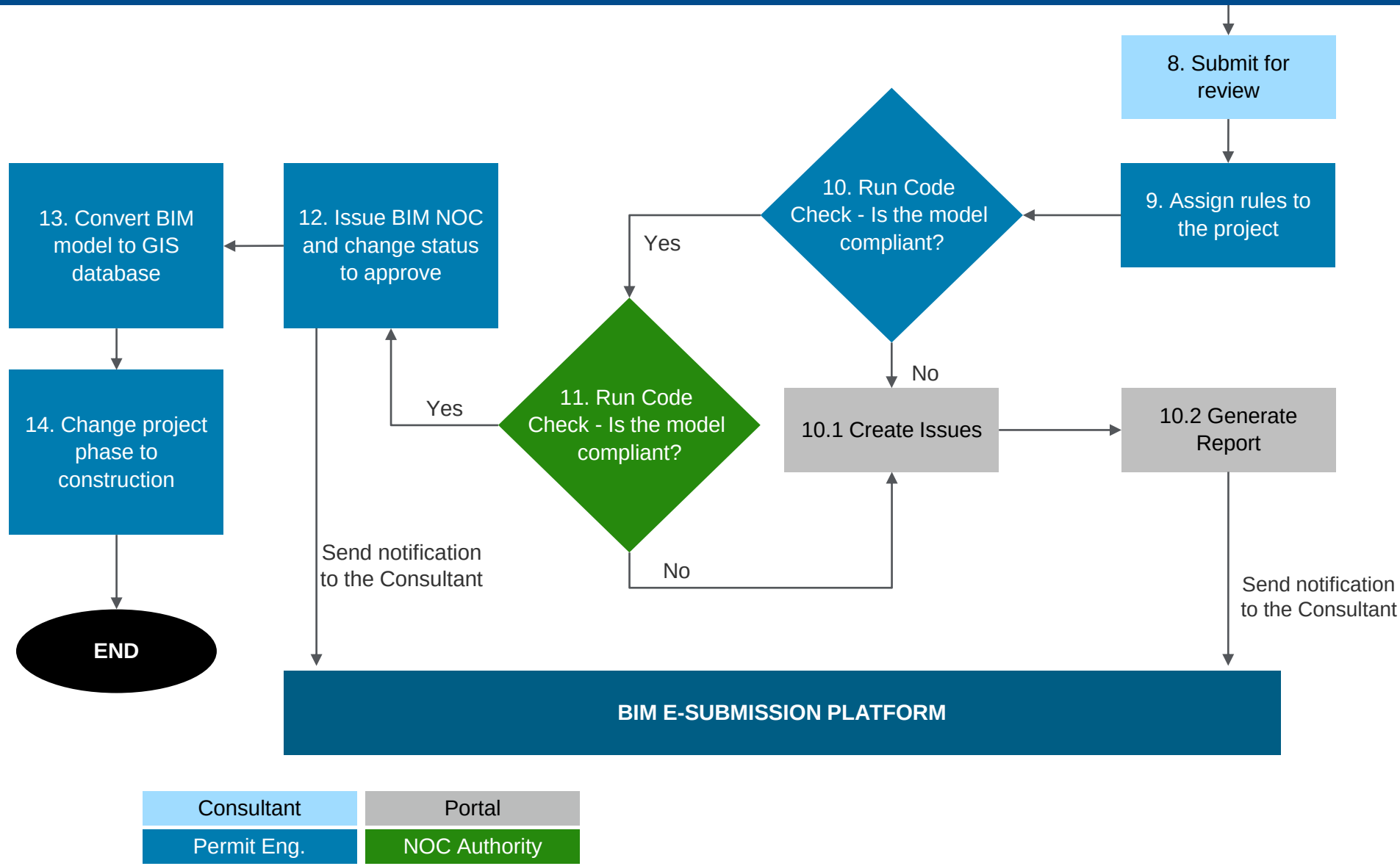
Dubai, UAE – BIM Workflows

Source: 2021 BIM eSubmission Presentation

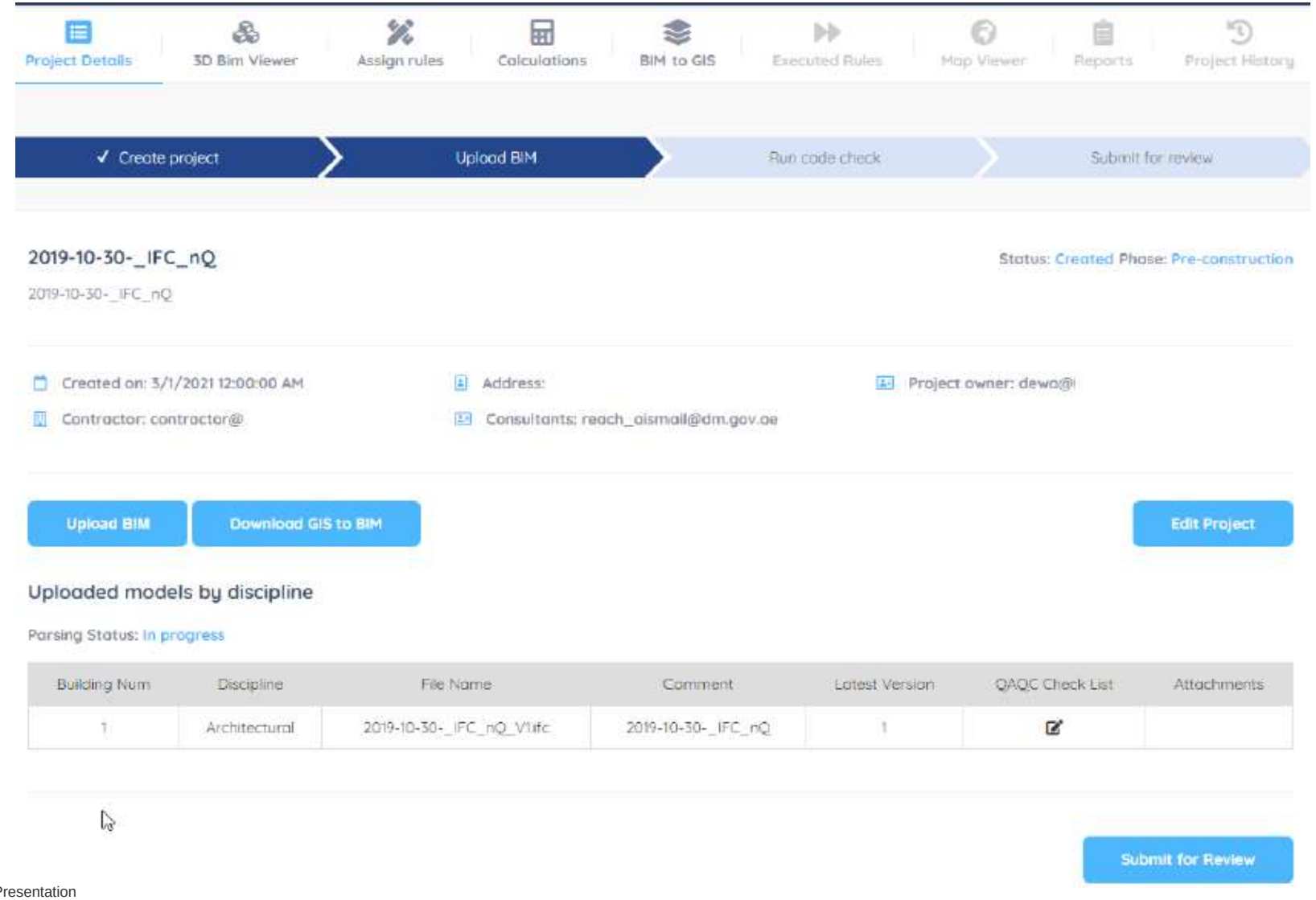


Dubai, UAE – BIM Workflows

Source: 2021 BIM eSubmission Presentation

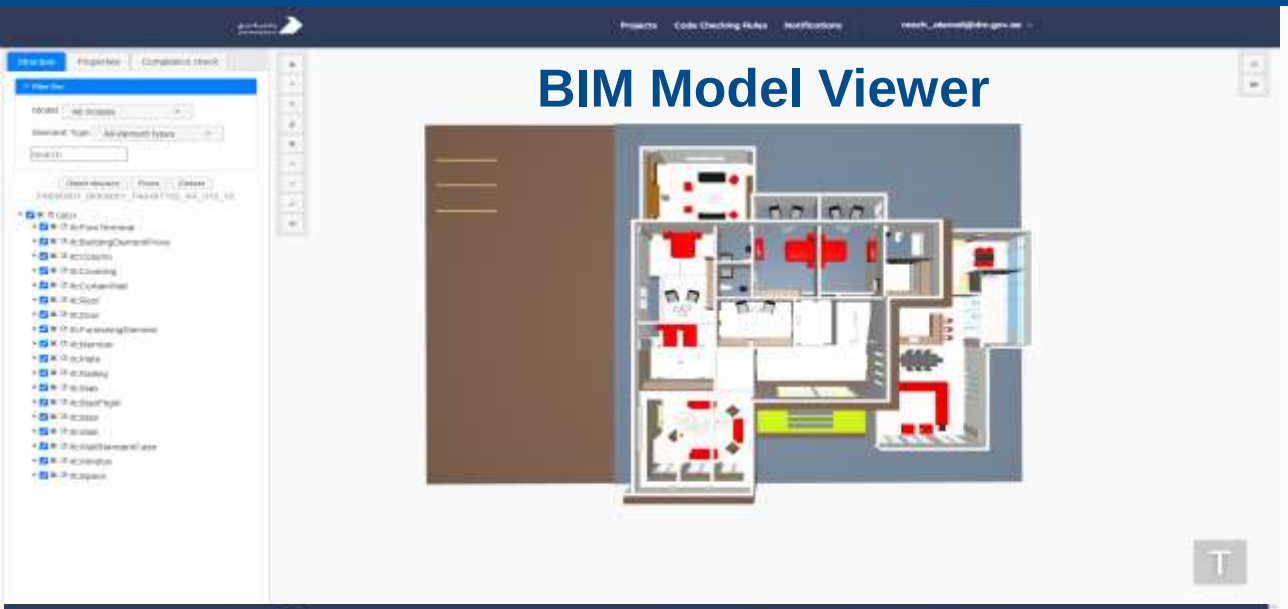


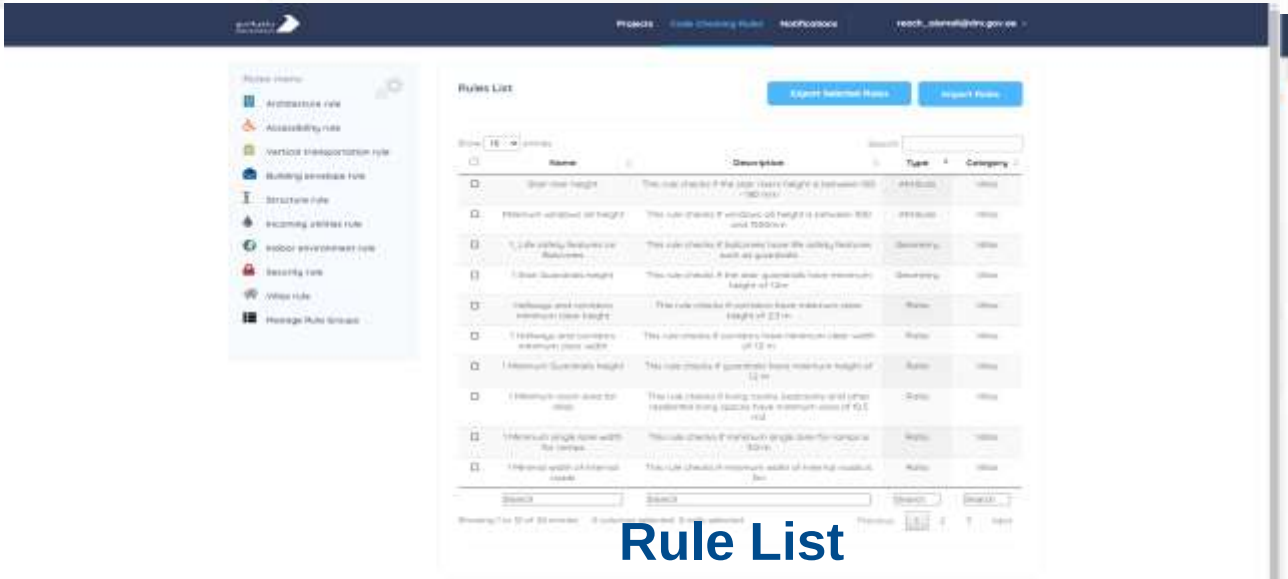
Dubai, UAE – Submission Platform

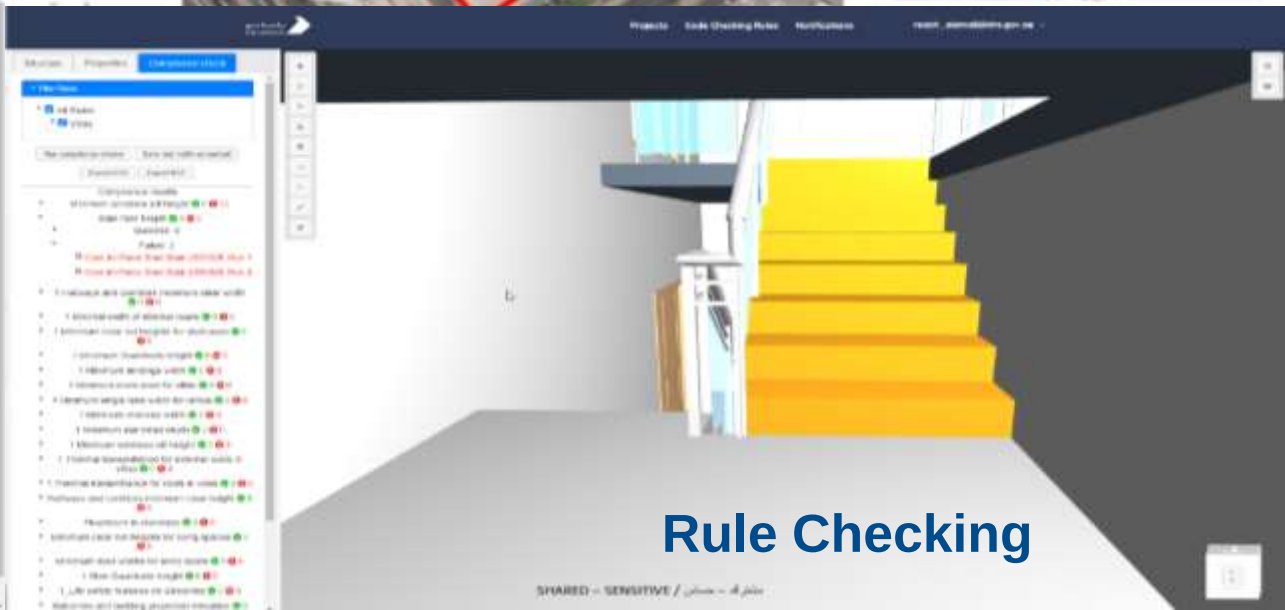


Source: 2021 BIM eSubmission Presentation

Dubai, UAE – Submission Platform

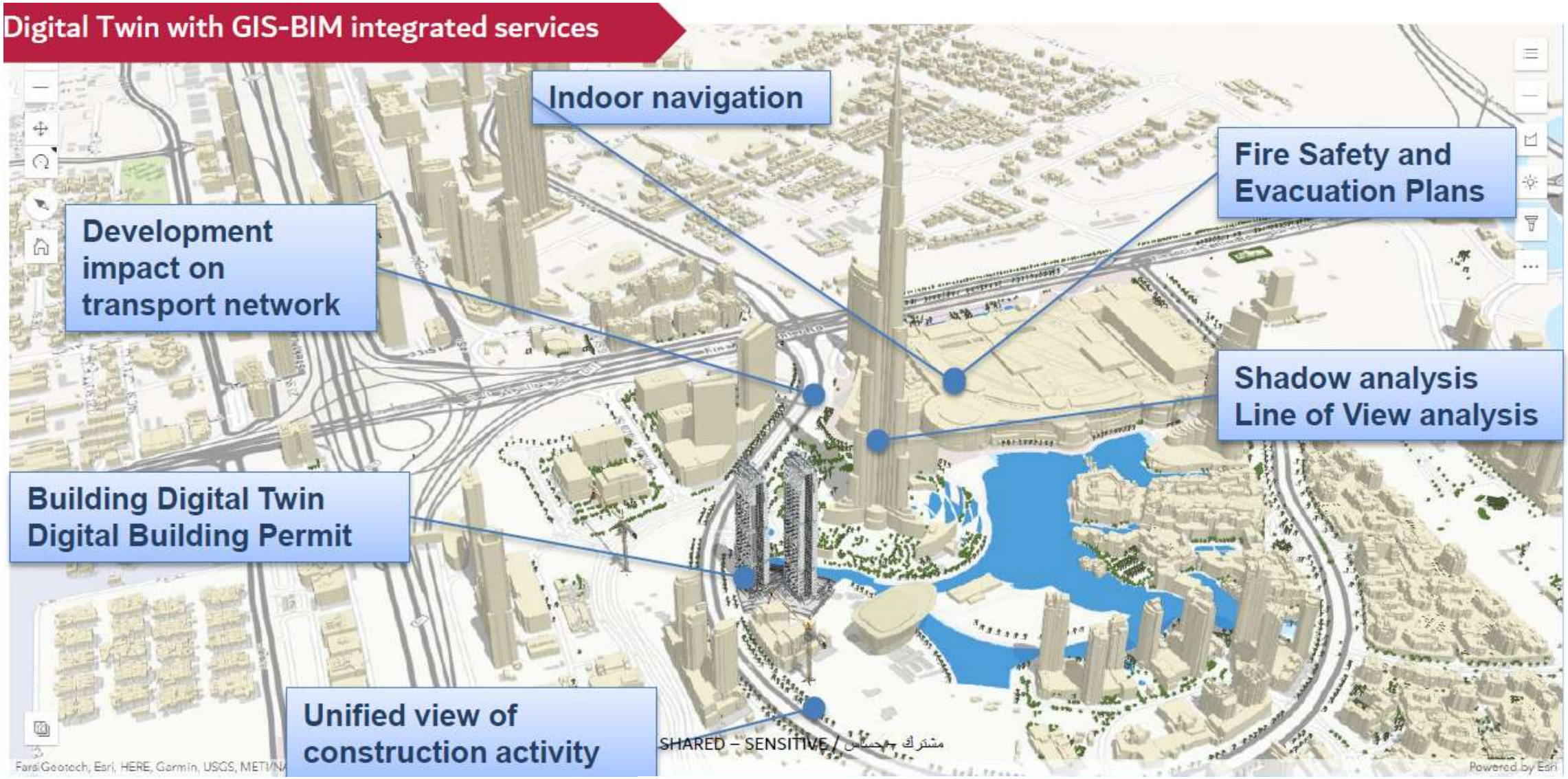






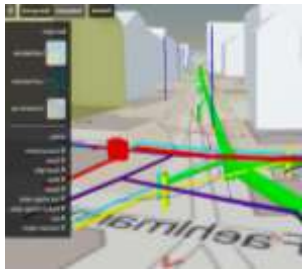
Content from 2021 BIM eSubmission Presentation

Dubai, UAE – BIM and Digital Twin Possibilities



Other Examples of E-Permitting with BIM Submission - Estonia

- Estonian government aims to **triple productivity** by 2030 by creating of a secure and reliable data exchange platform for construction – the **E-Construction Platform**.
- Estonia has a building registry – a digital database for all building – which offers a **100% digital building permit process**.
- The E-Construction platform provides lossless exchange of standardized and trustworthy data between **all stakeholders** throughout the building
- Significant work included developing the **open data portal**, a construction classification system, **BIM requirements**, and **BIM templates** as well as redesigning **processes**.
- **Digital Twin pilot** ran in 2018/2019
- Conducted a BIM-Based permitting process pilot that allowed **for automated checks**



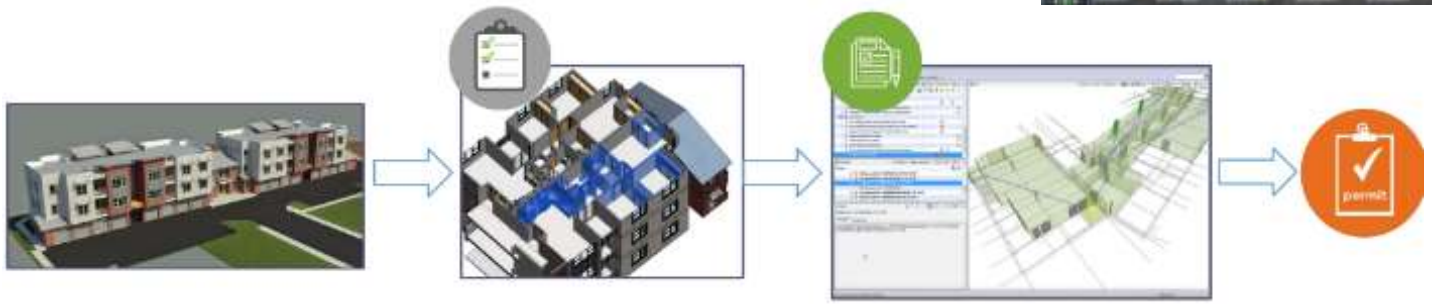
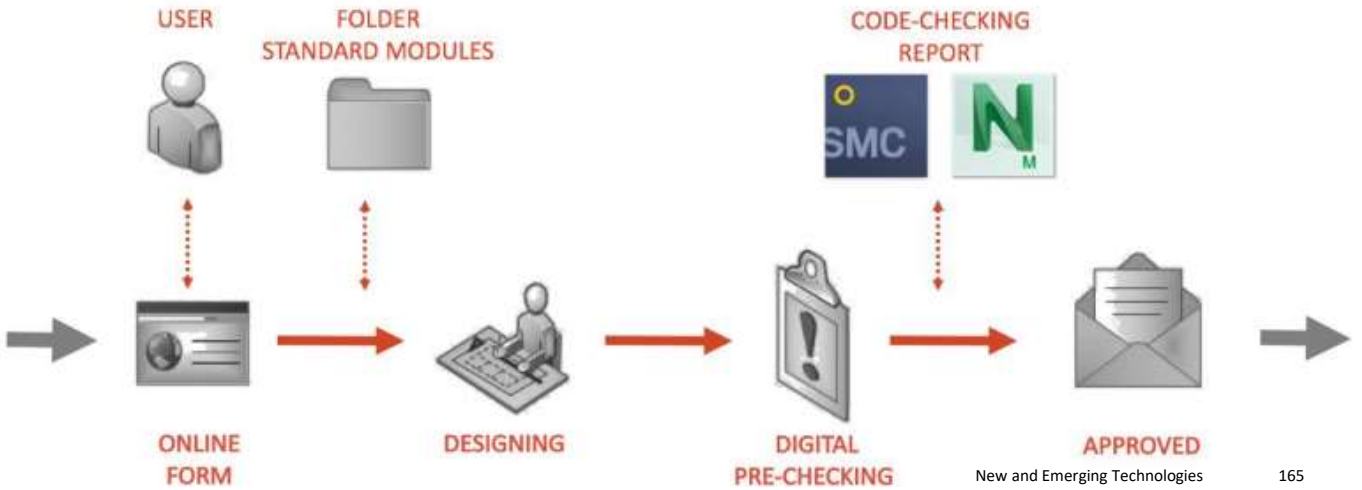


Image from: https://eehitus.ee/

Other Examples of E-Permitting with BIM Submission – Milan, Italy

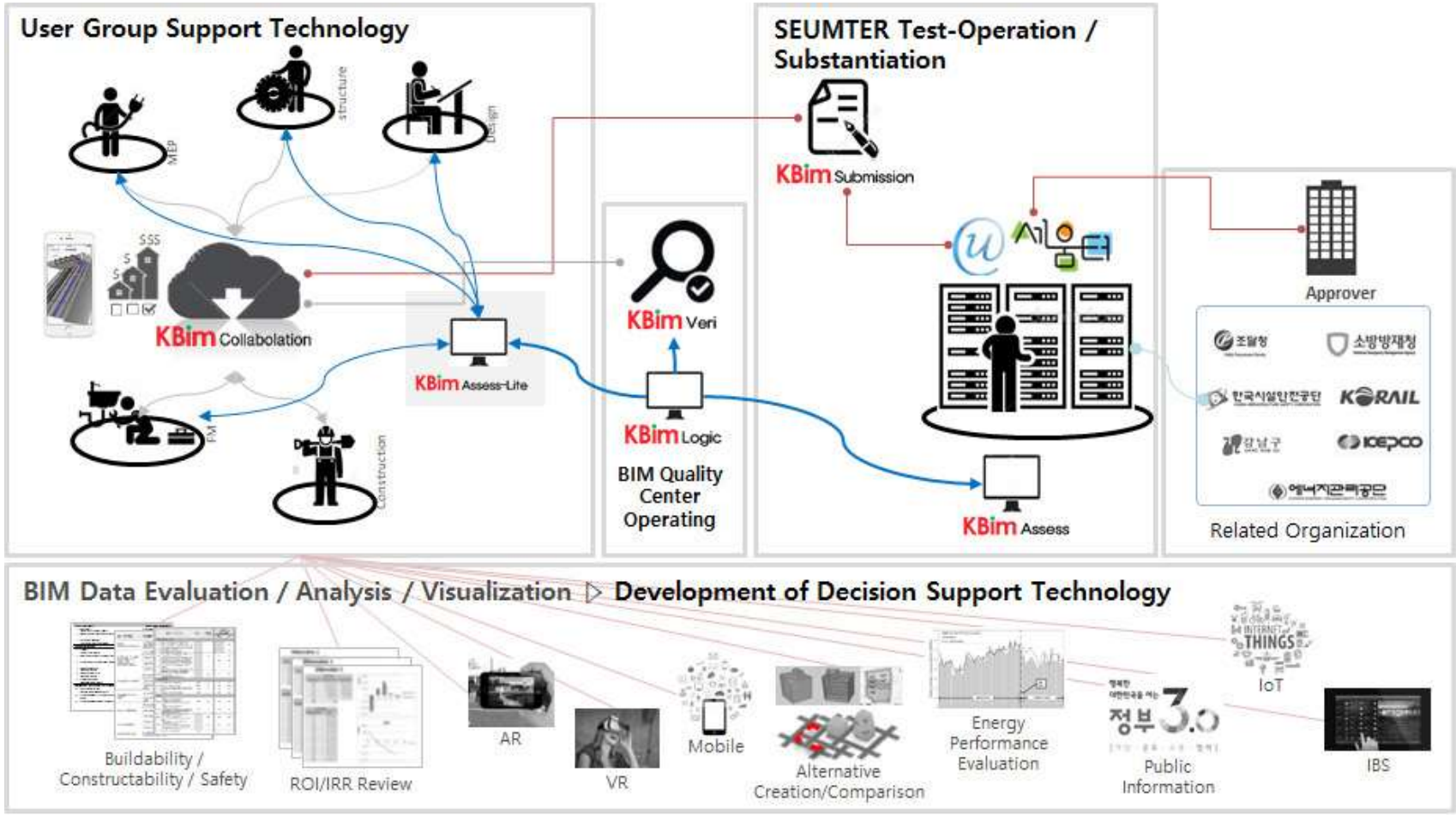
- Applies commercially available model checker to pre-check applicants
- Code check is embedded in the model checker, the applicant checks their BIM model against the local building code and the output of checking result is shared between applicant and regulator.



Content from bSI's e-submission common guideline

Other Examples of E-Permitting with BIM Submission – South Korea

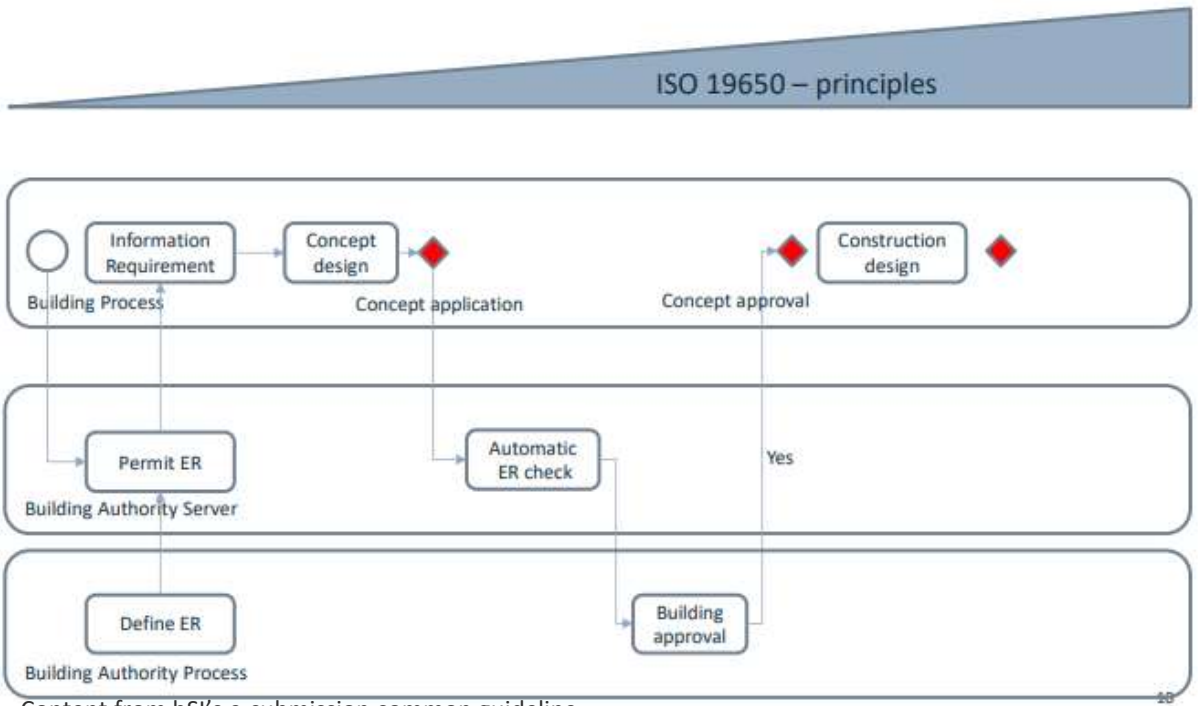
- South Korea underwent a 5-year, $25M USD research and development project (KBIM) after the government identified the need to digitize the AEC sector.
- Research included participation from over 100 companies, universities, government agencies, and research institutes.
- Three main projects emerged:
  - OpenBIM Standards
  - OpenBIM based code checking and evaluation
  - OpenBIM based building maintenance



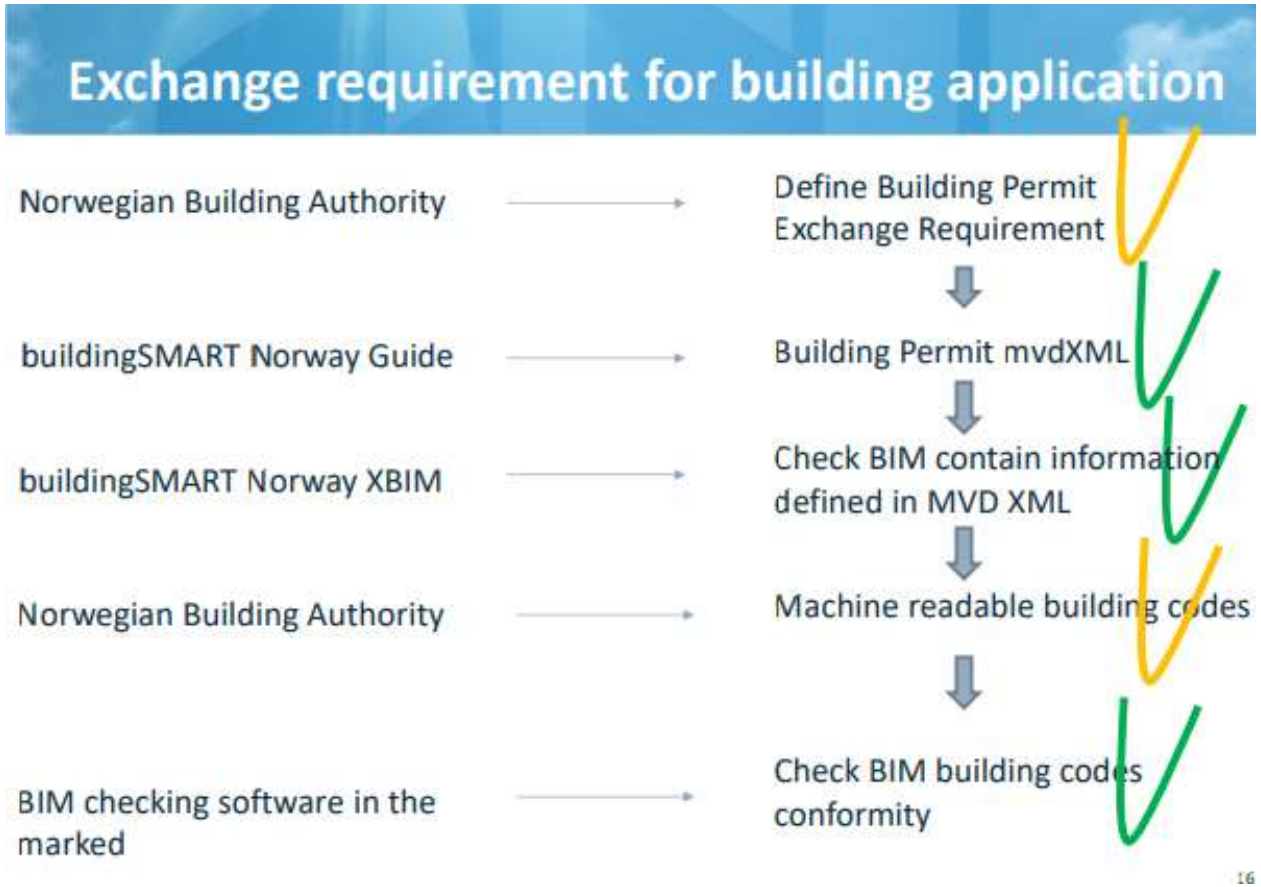
Content from KBIM

Other Examples of E-Permitting with BIM Submission - Norway

- Norway established an information exchange specification in an open format which promotes software vendors to develop software compatible with the required specifications.
- With the consistent inputs, Norway is trialing automated code compliance checking opportunities

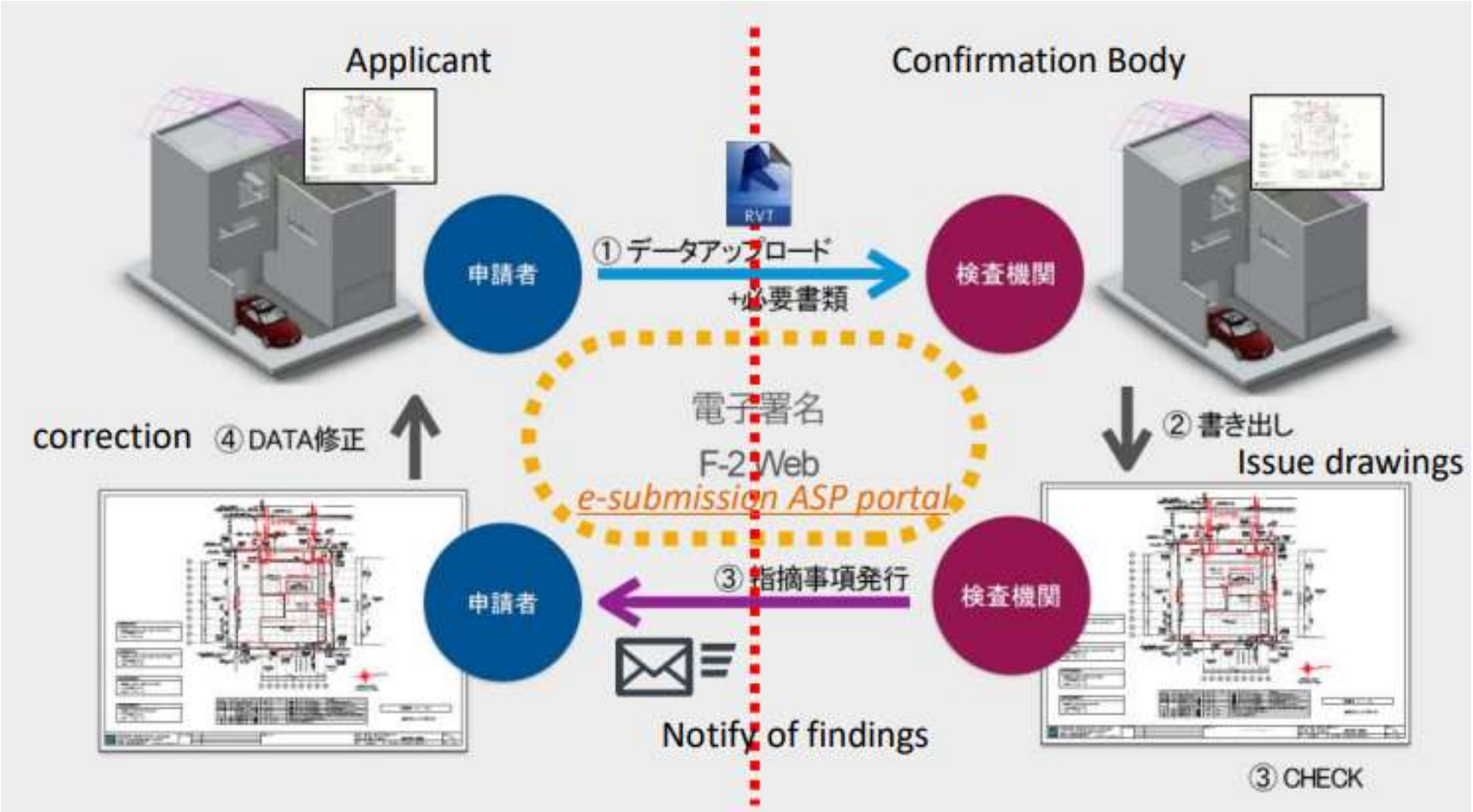


Content from bSI's e-submission common guideline



Other Examples of E-Permitting with BIM Submission - Japan

- Drawings are expected to be consistent under BIM environment
- Applicant drawings are submitted as a BIM file.
- By submitting the BIM model file consistency of the outputted drawing is maintained.



Content from bSI's e-submission common guideline

OAKVILLE

Property Development Digital Plan: A Digital Transformation Solution

Governance and Operational Models

AECO innovation lab

in partnership with

Deloitte.

How to Structure Oakville for Success

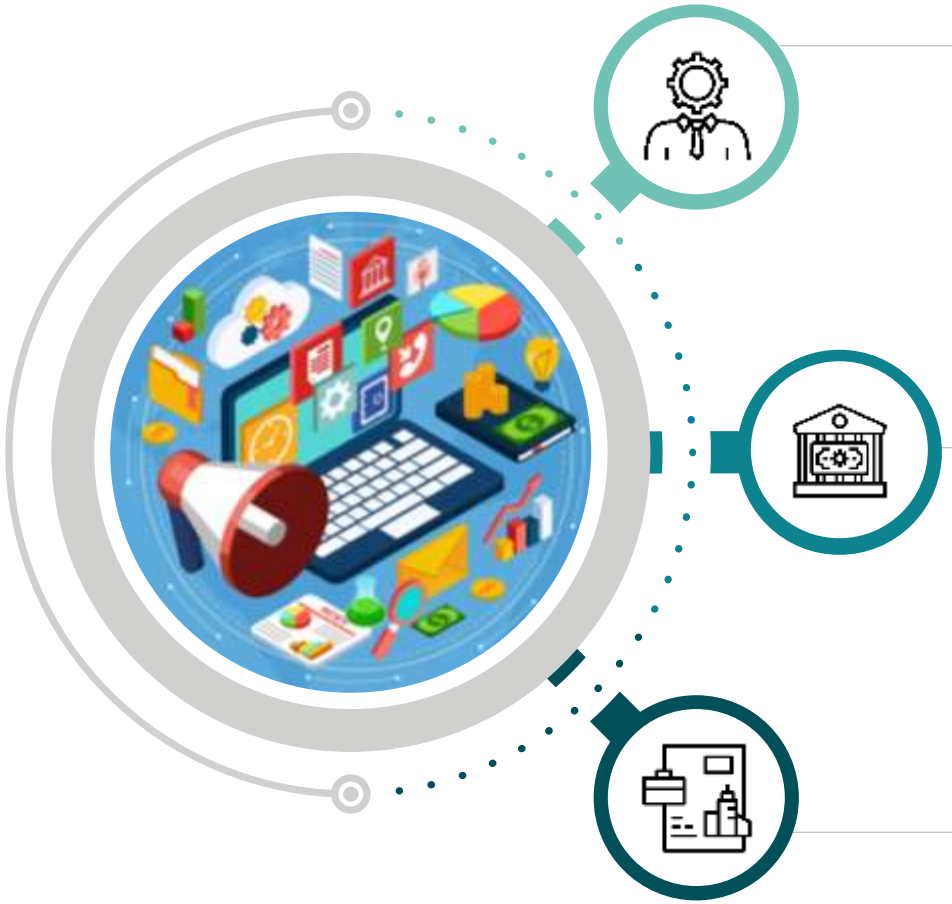
In order to successfully implement the Digital Plan and Roadmap and ultimately achieve the Digital Vision, a clear **governance structure** is required. This includes identifying who oversees the implementation and who has the authority to make decisions.

Additionally, it is also important to know how many staff will be required to implemented the digital plan and eventually **operate and maintain** the new technologies and processes.

Proposed Governance Model

Future State – Digital Plan Implementation | Considerations

This governance model is for the implementation of the digital plan for the Property Development Services.



Introduction of a Director of Digital Services

The role of the Director of Digital Services is to bridge the gap between strategy and execution and ensure alignment within programs and across the Town of Oakville. From an organizational chart perspective, this director should report to the Commissioner of Community Development and the Commissioner of Community Infrastructure.

Establishment of a Central Authority

The Property Development Service will need a central authority to implement the Digital Plan – this includes creating a Director of Digital Services that sit at the same level of authority as other department heads. This new director will be responsible for implementing the Plan.

A Focus on Property Development Services

The proposed model includes a renewed focus on property development services.

A Program Management Approach

The suggested model follows a program management approach to implement the Digital Plan and Roadmap

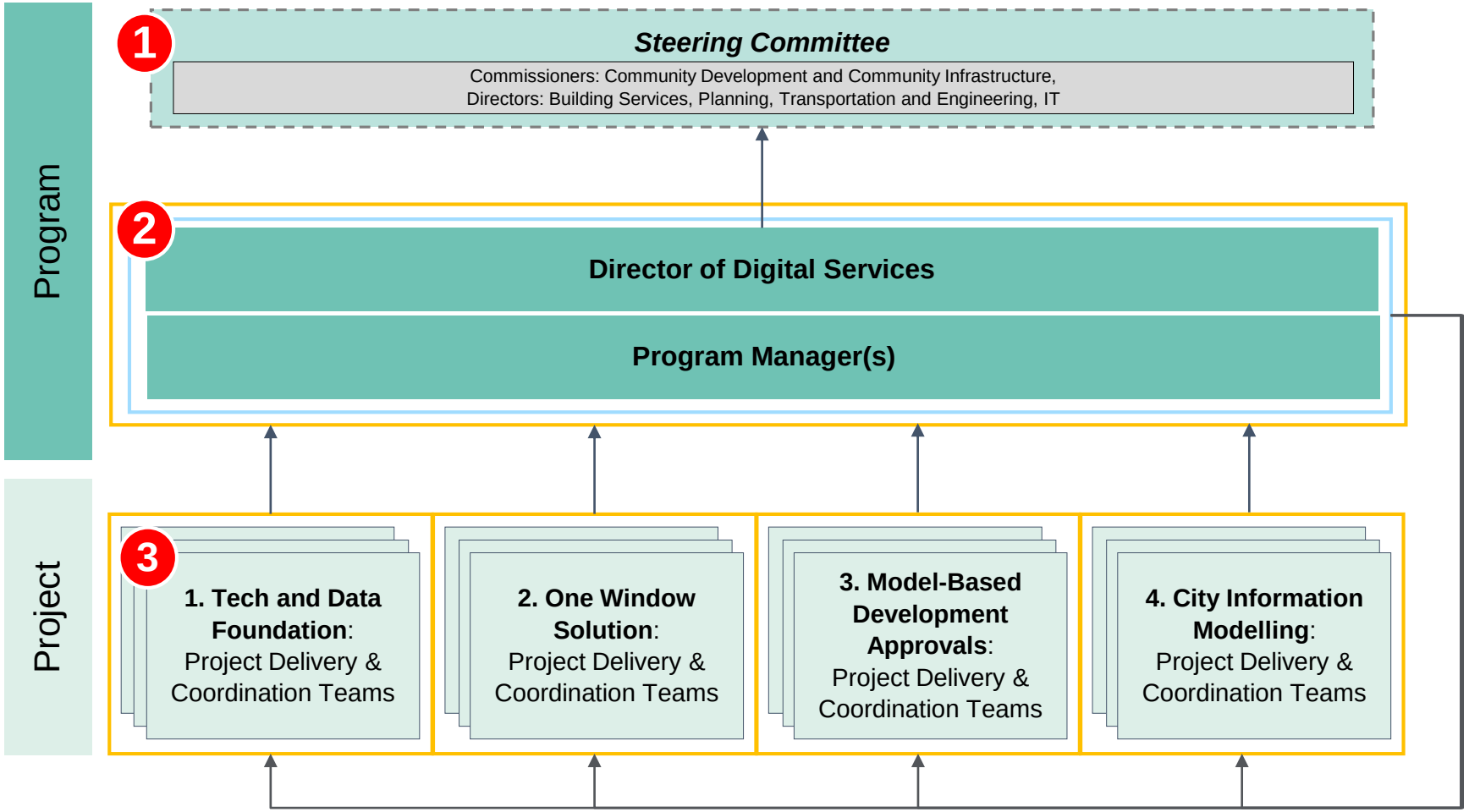
What is Program Management?

Per the Project Management Institute, a program is a group of related projects managed in a coordinated manner to obtain benefits not available from managing them individually. Program management is the application of knowledge, skills, tools and techniques to meet program requirements.

Why a Program Management Approach?

The Digital Plan and Roadmap is an intensive, extensive series of programs and projects that will greatly affect how work is being done at the Town. It requires the strategic acumen of a program manager to coordinate the programs and projects with all the relevant stakeholders and ensure that the overall goals and objectives of the project are achieved.

Governance Structure | Future State



Description

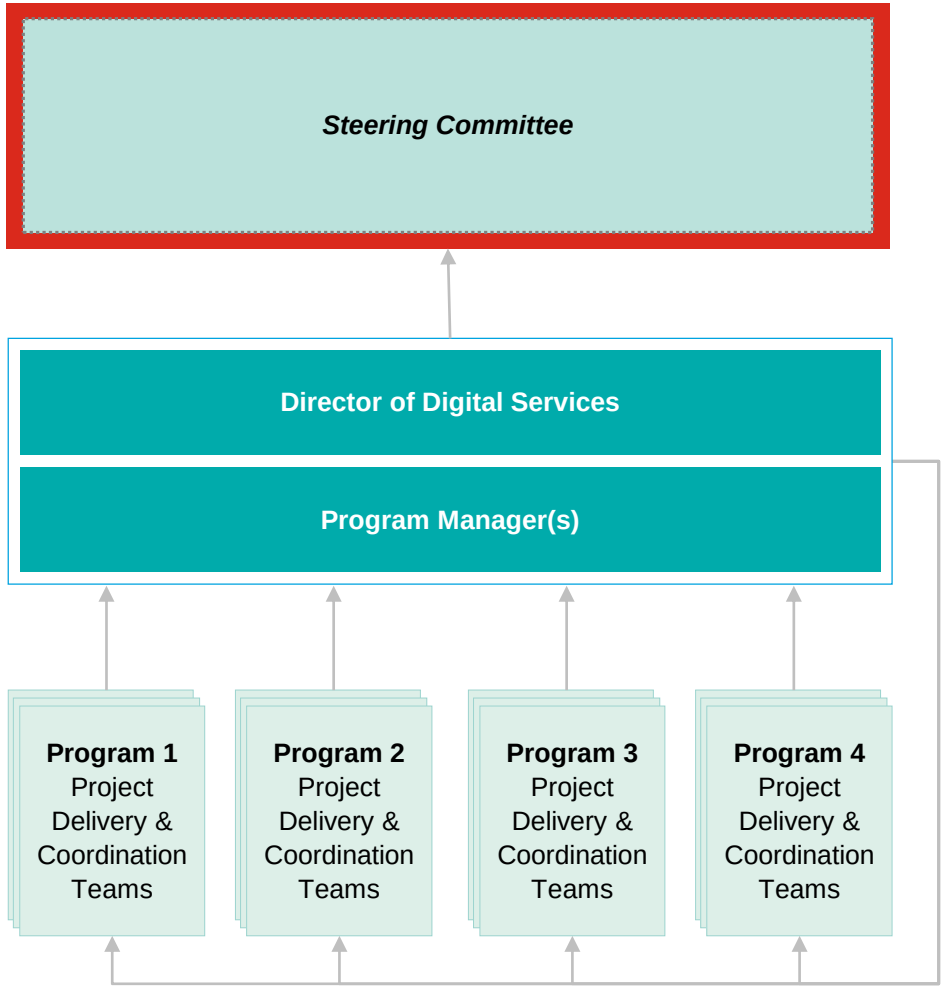
1. The **Steering Committee** promotes coordination and guide strategic-decision making across each of the programs by providing a forum to share lessons learned, identify / manage dependencies, and jointly resolve issues affecting multiple projects.
2. The **Director of Digital Services** and **Program Manager(s)** makes major project decisions at a program level and provides guidance to Project Delivery & Coordination. Provides subject matter expertise to the Program Manager and Project Managers. Assist in defining project and/or program deliverables. Provide advice and guidance on items extending beyond the scope of any one project or those with corporate implications.
3. The **Project Teams** consist of cross-departmental staff and complete the daily work to deliver projects and perform initiative-level coordination to ensure effective project delivery including status updates, working groups, interdependency management, and stakeholder engagement.

Steering Committee

A committee to manage and implement the Digital Plan and Roadmap

Responsibilities:

- Accountable for the implementation of the Roadmap
- Act as the final decision-maker for the delivery of Roadmap activities
- Ensuring business needs and objectives are being met throughout the implementation of the Roadmap
- Ensures alignment with other corporate and departmental strategies
- Identify and provide resources to implement the roadmap
- Review and monitor progress
- Provide input representing their department or area of expertise
- Serve as a conduit for communication to/from others regarding the roadmap
- Assist the Director of Digital Services resolving conflicts that extend beyond their control
- Champion the digital plan and roadmap within their respective departments and leads change management efforts
- Remove roadblocks for the Director of Digital Services and program managers
- Accountable for evaluating the benefits

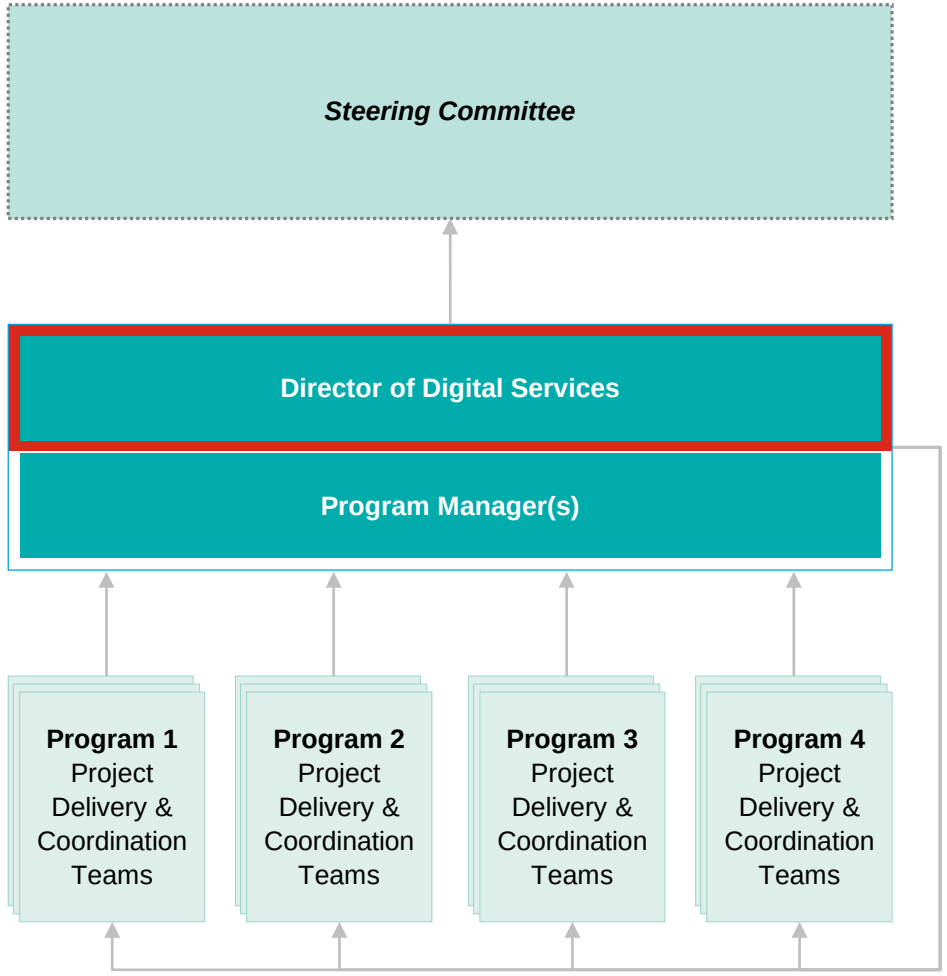


Director of Digital Services

Responsible for overseeing the day-to-day implementation of the Digital Plan and Roadmap

Responsibilities:

- Coordinate with the Steering Committee to ensure that corporate initiatives are incorporated into the implementation of the Digital Plan and Roadmap
- Report to the steering committee on progress and works with the steering committee to resolves issues and manage interdepartmental collaboration
- Clarifying direction and objectives to the program managers and project teams to ensure business objectives are met and other initiatives are accounted for
- Ensures goals are achieved and programs/projects are delivered on time and within budget
- Identifies opportunities for strategic collaboration between the Digital Roadmap implementation team and other opportunities at the Town
- Develops management plan – scope, schedule, budget, communication, resources, benefit realization, quality, and procurement
- Leads change management and communication activities
- Identifies potential resources to assist in the implementation of Digital Plan and Roadmap
- Resolves interdependencies, examines progress to plan and alters course

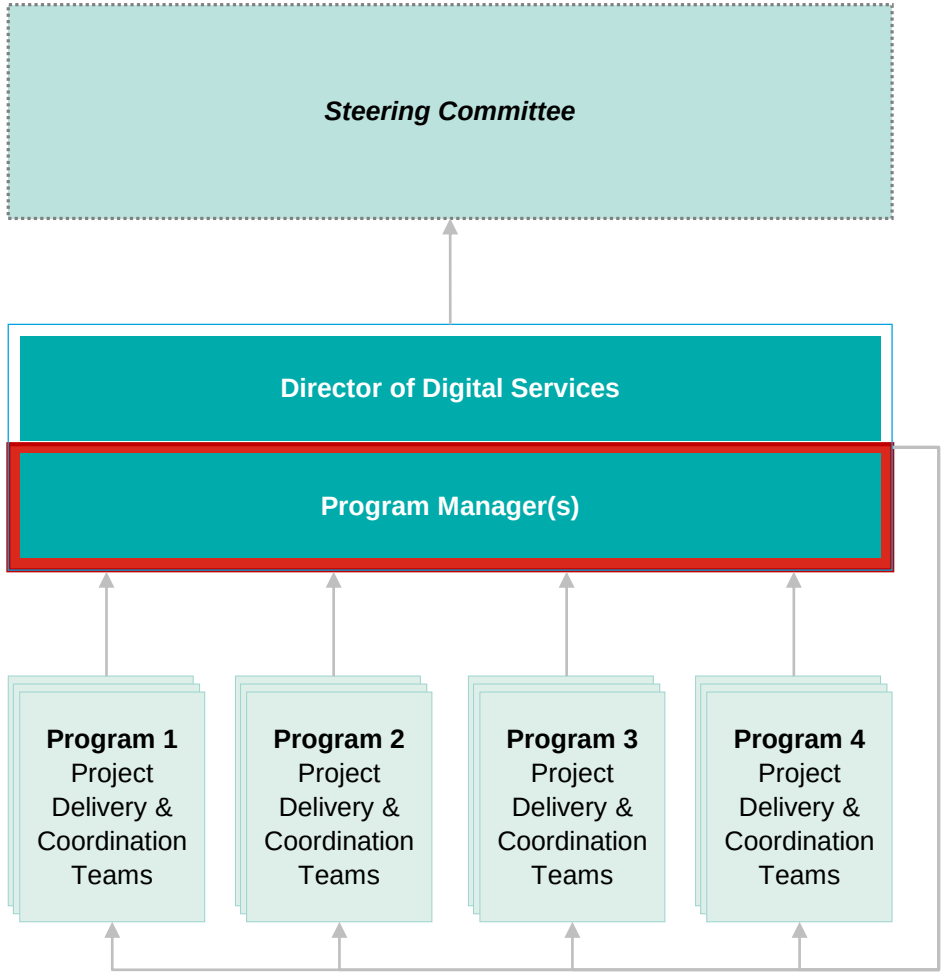


Program Manager(s)

Person or persons under the Director of Digital Services to assist in the day-to-day management of the Program

Responsibilities:

- Accountable to the Director of Digital Services
- Responsible for managing all aspects of their assigned program(s)/project(s) to ensure the program objectives are met and the program is delivered on time and within budget through proper program management practices
- Responsible for resolving issues within their control and/or escalating those beyond their control to the Director of Digital Services for further coordination
- Identify required resources (people, funding, and equipment) to deliver the program and component projects
- Provide regular reporting to the Director of Digital Services on progress and issues that may affect implementation
- Heed warnings, advice, and recommendations from project teams to ensure program is implemented according to program goals.

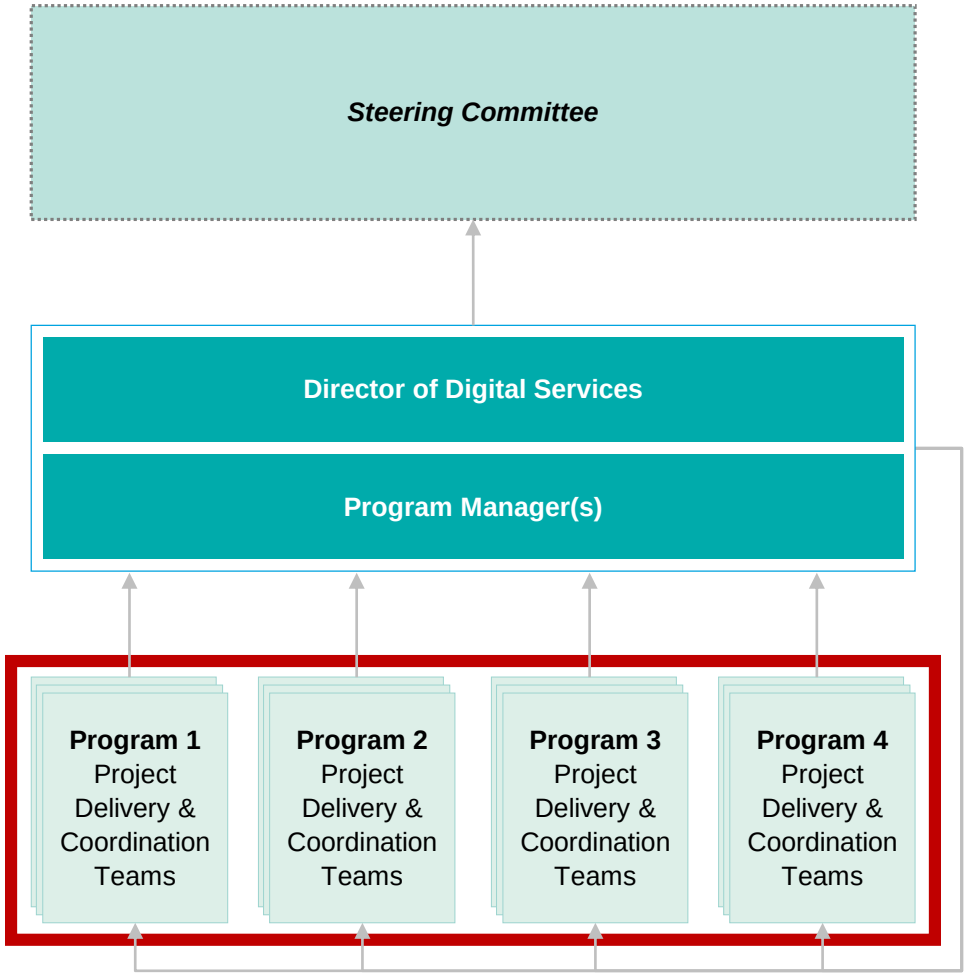


Project Teams

Works with the Program Managers to ensure projects are delivered on time

Responsibilities:

- Provide input and expertise in completing assigned tasks
- Support the role of the program manager in a timely manner
- Attend meetings and provide status updates
- Document and report on required information throughout the project
- Identify potential challenges and inform the Program Manager

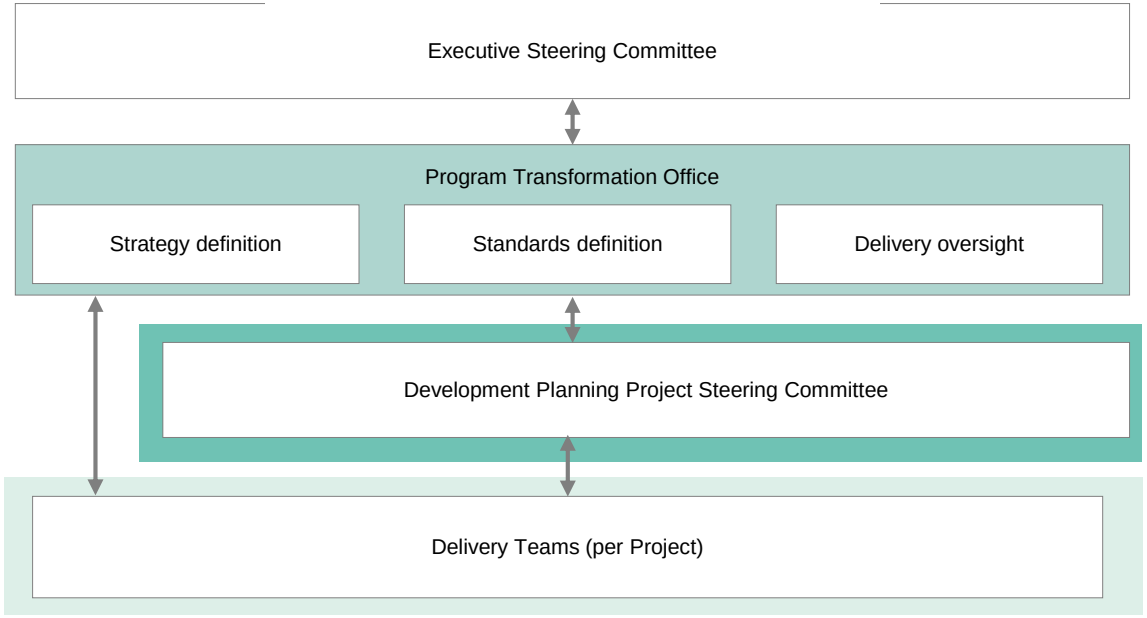


Proposed Operational Model

Proposed Operational Model

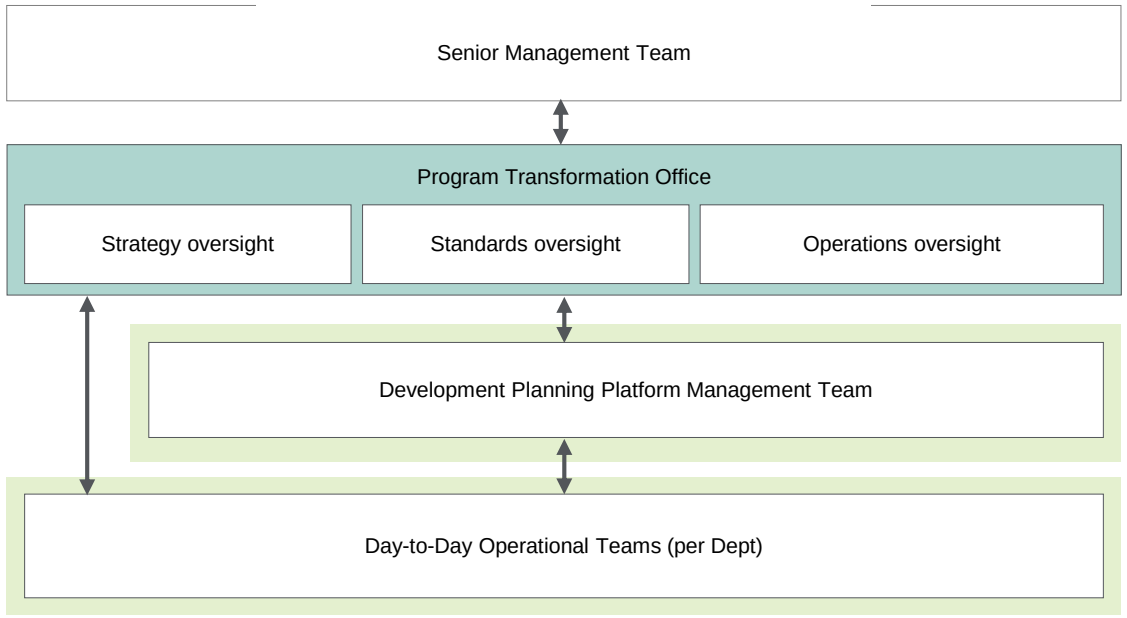
There will be a need to evolve the governance structure as Town of Oakville transitions from its Digital Platform (planning ingestion and compliance checking) Transformation and initiative implementation to day-to-day operations. The Transformation Office will provide the necessary oversight as the same team responsible for overseeing delivery and therefore most knowledgeable on the platform specifics. This is typically known as a DevOps model (Development to Operations), and this function is recommended to be maintained for a reasonable period as knowledge management processes and procedures are implement to support continuity planning.

Transition State Governance Model



- The **Steering Committees** will be primarily focused on supporting the implementation of initiatives across the Programs, acting as a coordination and collaboration function to enable efficient execution.
- The **Delivery Teams** will execute implementation plans for specific initiatives within the program, working with applicable departments and other governance bodies as needed to meet target deadlines.
- **The Transformation office, Project Steering Committees** and the **Delivery Teams** will evolve into different governance bodies, with different functions as part of the End State Governance Model.

Operational State Governance Model



- The **Steering Committee** will evolve into the **Platform Management Team**. The Management team will own the customer service delivery and internal workflows on an ongoing basis, including defining and delivering on the experience across all elements of the operating model (e.g., customers, approvals, tiers, services, channels, locations). The Management Team will centralize management development planning approval process (internal and external), ensuring consistency at an organizational level and offering guidance and leading practices across divisions.
- The **Delivery Teams** will evolve into the **Day-to-Day Operational Teams**. These Teams will be responsible for oversight, consistency, and ongoing upskilling aligned to services tiers, overall strategy, and supporting workforce enablement.

OAKVILLE

Property Development Digital Plan: A Digital Transformation Solution

Change Management

AECO innovation lab

in partnership with

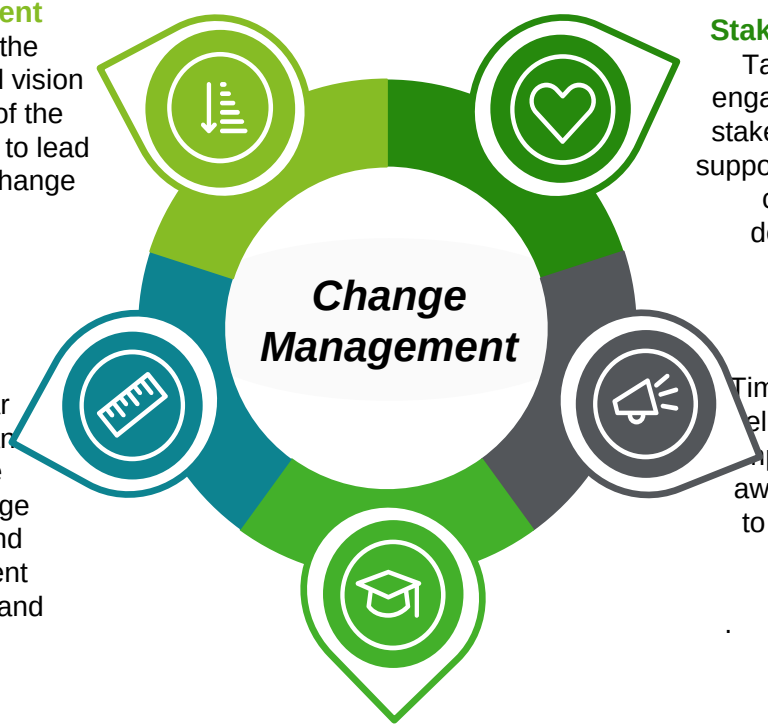
Deloitte.

Change Management | Introduction

The Change Management efforts for the Town of Oakville are designed to pull on the following elements throughout the transformation of Oakville's property development services, building willingness and acceptance while managing technology impacts, people, policy, and process.

Leadership Alignment
Align leaders across the municipality, on a shared vision and common purpose of the program to prepare them to lead their team through the change

Stakeholder Engagement
Targeted and impactful engagement activities for all stakeholders to prepare and support them for the upcoming changes to property development services



Measurement & Sustainment
Identification and regular monitoring of key performance indicators to assess the effectiveness of the Change Management activities and level of overall engagement and adoption of new skills and behaviours

Communications
Timely, consistent and effective delivery of communication to all impacted stakeholders to build awareness, support and buy-in to enable and sustain change efforts

.

Learning
Develop and deliver training to enable all end users to adopt the new capabilities, skills, tools, and processes required to successfully adopt the new ways of working

- The change management for the transformation of property development services in Oakville will be an **ongoing** and **sustained** process for many years
- Different **change strategies** and **capabilities** will be required at different times for different stakeholders
- The following slides detail how change management has been **embedded across the different phases** of the **current project** to develop a digital vision and plan, guided by Deloitte's Vision to Value Methodology

Vision to Value Methodology

Change Management Methodology

As the Town of Oakville begins the digital transformation journey of its property development services, Deloitte's Vision to Value Methodology has guided the change efforts, with particular focus on '*defining purpose.*'

Define Purpose	Visualize the business future, build the conditions for leader-led change, mobilize and engage communities
Design for Impact	Define the case for change, personalize the change experience, use data analytics to direct the change effort
Develop Capability	Accelerate future skill sets, activate business networks to drive a tipping point in change adoption, make behaviors everyday habits
Drive Through Performance	Onboard people to their new reality, follow through with performance support, recognize success and evolve

Define Purpose	Design for Impact	Develop Capability	Drive Through Performance
• Clear need for change and sense of urgency • Articulated benefits & impacts • Alignment of leaders • Engagement with key communities	• A comprehensive change roadmap, using data • Identification and mitigation of key risks • Defined process to shape culture	• Business networks are equipped to drive the change agenda. • People introduced to new roles, skills and behaviors • Learning drives individualized ways of learning	• Everyone working in the new way • People feel empowered and able to adapt • Tools and accelerators ensure successful transformation

Change Management Elements

The Vision to Value Change Management Methodology aligns with other leading change management approaches and shifts the focus from the ‘what’ to the ‘how’ and ‘why.’

Deloitte’s Vision to Value Change Management Methodology

Define Purpose	Visualize the Business Future Build the Conditions for Leader Led Change Mobilize and Engage Communities
Design for Impact	Use Data Analytics to Direct the Change Effort Define the Change Campaign Personalize the Change Experience
Develop Capability	Accelerate Future Skill Sets Activate Business Networks Onboard People to Their New Reality
Drive Through Purpose	Make Behaviours Everyday Habits Follow Through with Performance Support Recognize Success and Evolve

ADKAR Change Management Methodology

Awareness of the need to change	**Phase 1** Preparing for Change	Define change management strategy Prepare change management team Develop sponsorship model
Desire to support / participate in the change		
Knowledge of how to change	**Phase 2** Managing the Change	Develop change management plans
Ability to implement the required skills and behaviours		Take action and implement plans
Reinforcement to sustain the change	**Phase 3** Reinforcing Change	Collect and analyze feedback Diagnose gaps and manage resistance Implement corrective actions and celebrate successes

Transformation Journey

While each element of the Vision to Value Change Methodology will be required throughout the digital transformation of Oakville's property development services, the focus of this engagement has been to *define purpose.*

Deloitte's Vision to Value Change Management Methodology		ADKAR Change Management Methodology		
We are here	**Define Purpose**	Visualize the Business Future Build the Conditions for Leader Led Change Mobilize and Engage Communities	**Awareness** of the need to change **Desire** to support / participate in the change	**Phase 1** Preparing for Change	Define change management strategy Prepare change management team Develop sponsorship model
	Design for Impact	Use Data Analytics to Direct the Change Effort Define the Change Campaign Personalize the Change Experience	**Knowledge** of how to change	**Phase 2** Managing the Change	Develop change management plans
	Develop Capability	Accelerate Future Skill Sets Activate Business Networks Onboard People to Their New Reality	**Ability** to implement the required skills and behaviours		Take action and implement plans
	Drive Through Purpose	Make Behaviours Everyday Habits Follow Through with Performance Support Recognize Success and Evolve	**Reinforcement** to sustain the change	**Phase 3** Reinforcing Change	Collect and analyze feedback Diagnose gaps and manage resistance Implement corrective actions and celebrate successes

Throughout this engagement, the change efforts place emphasis on *defining purpose* and use the following principles as a guiding post: *visualize the business future; build the conditions for leader-led change; and mobilize and engage communities.*

Define Purpose

Change Element: Define Purpose

FROM TODAY...

In the current state, the Town of Oakville's change efforts place emphasis on *Defining Purpose* through the following actions:

- ✓ Developing a clear and compelling vision
- ✓ Bringing the vision to life for senior and mid-level leaders, focusing on the 'why'
- ✓ Engaging, energizing and enthusing leaders
- ✓ Shaping feedback mechanisms
- ✓ Building the knowledge and capability of leaders
- ✓ Responding to feedback

...TO TOMORROW

As the program moves towards implementation, the following change methodologies should be adopted:

- **Design for Impact:** Define the case for change, personalize the change experience, use data analytics to direct the change efforts
- **Develop Capability:** Accelerate future skill sets, activate business networks to drive a tipping point in change adoption, make behaviours everyday habits
- **Drive Through Performance:** Onboard people to their new reality, follow through with performance support, recognize success and evolve

GUIDING PRINCIPLES

Throughout this engagement, the change management strategy has been developed and continuously refined to help the Town of Oakville visualize the business future, build the conditions for leader-led change, and mobilize and engage communities.

1. Visualize the Business Future
2. Build the conditions for leader led change
3. Mobilize and engage communities

Change Element: Define Purpose

Key Activities & Objectives

1) Visualize the business future

Deliver **engagement sessions** with leaders to create a picture of business purpose, change intent, and end state

2) Build the conditions for leader-led change

Provide leaders with a **best practices and contextual information** to drive, sponsor, engage and support the business through the change

3) Mobilize and engage communities

Organize groups to **co-create the design**, including the transformation purpose itself and/or the journey to get there

Expected Value

✓ **The need for change is clear** and there is a sense of urgency to take action.

✓ The **benefits of change are well articulated**, clearly aligned to strategic goals and communicated with impact.

✓ **Leaders are aligned** and well equipped to drive a campaign for change.

✓ **Key communities have been engaged** and are ready to respond to a call for action.

QUESTIONS EXPLORED

1. What are the Town of Oakville's strategic **goals and aspirations**?
2. What **problems** are the Town of Oakville trying to solve?
3. Is the municipality ready to undertake the **transformation journey**?
4. Do leaders have a **common view** of the problem, possibilities, and direction of change?
5. Do you have the pulse on the communities who will **influence success**?

Change Management Activities

Change Activities | Phase One

In Phase One, we prioritized leadership alignment conversations and continuous engagement with key stakeholders to better understand their priorities, limitations, opportunities, and potential challenges.

Overall Approach

Define Purpose
Visualize the business future, build the conditions for leader-led change, mobilize and engage communities

Activity	Description	Change Element	Frequency/ *Indicative* Timing
Stakeholder Assessment	• Initial identification of key stakeholders in this project at all levels • Prioritized key stakeholders based on their level of readiness / the impact to stakeholder • The stakeholder analysis acts as a living document to collect and track data, inputs, and assessments by identified stakeholder group	• *Mobilize and engage communities*	• Ongoing
Stakeholder meetings	• Initial discussion with key stakeholders to be able to understand standpoints of internal and external stakeholders, their priorities, limitations, opportunities and potential challenges • Twelve (12) key stakeholder interviews conducted to inform digital vision	• *Mobilize and engage communities*	• Once (May/June)
Weekly meetings	• Ongoing meetings with the Program Manager and Executive Sponsor to inform digital vision	• *Build the conditions for leader led change*	• Weekly
Sponsor Coalition Phase One Presentation	• Presentation to Sponsor Coalition on the Phase 1 deliverable (digital vision and ambition) for feedback and buy-in	• *Visualize the business future* • *Build the conditions for leader led change*	• Once (June 23rd)
Phase One Deliverable Presentation	• Presentation to key Town of Oakville stakeholders (managers and staff) on the Phase 1 deliverable for feedback and buy-in	• *Mobilize and engage communities*	• Once (June 28th)
Feedback Review	• Feedback received from the Phase 1 deliverable was reviewed and suggestions incorporated into final deliverable	• *Mobilize and engage communities*	• Ongoing

Change Activities | Phase Two

In Phase Two, we prioritized building awareness, support and buy-in from key stakeholders across the Town of Oakville through continuous stakeholder engagement, dialogue, and workshops.

Overall Approach

Define Purpose
Visualize the business future, build the conditions for leader-led change, mobilize and engage communities

Activity	Description	Change Element	Frequency/ *Indicative* Timing
Stakeholder meetings	• Ongoing meetings with Lina and Jim to discuss progress to date and any relevant updates	• *Mobilize and engage communities*	• Monthly
Roadmap Engagement Session	• Roadmap Engagement Session for initial buy in of digital plan and roadmap • Key stakeholders include Lina and Jim	• *Mobilize and engage communities*	• Once (August 10th)
Governance Workshop	• Conducted governance workshop with Town of Oakville stakeholders for alignment of current state governance to inform future state governance discussions	• *Visualize the business future*	• Once (August 26th)
Draft Deliverable	• Presentation to Town of Oakville stakeholders on the Phase 2 deliverable for feedback and buy-in	• *Visualize the business future*	• Once (September 7th)
Sponsor Coalition Meeting	• Presentation to Sponsor Coalition on the Phase 1 deliverable (digital plan) for feedback and buy-in	• *Mobilize and engage communities*	• Once (September 13th)
Sponsor Coalition Survey	• Distribute surveys as a pulse-check to measure overall readiness and feedback. Results will be used to design a targeted approach to address any potential gaps.	• *Mobilize and engage communities*	• Once (September 13th)
Technology Literacy	• Summary of emerging technologies provided to Town of Oakville with workshops to be scheduled to reiterate and educate • Educational training curriculum defined • Educational working sessions scheduled	• *Mobilize and engage communities* • *Build the conditions for leader led change*	• Four working sessions

Change Activities | Phase Three and Four

Throughout Phases Three and Four, change approaches continued to place emphasis on mobilizing and engaging key stakeholders to better visualize the future of Oakville's property development services.

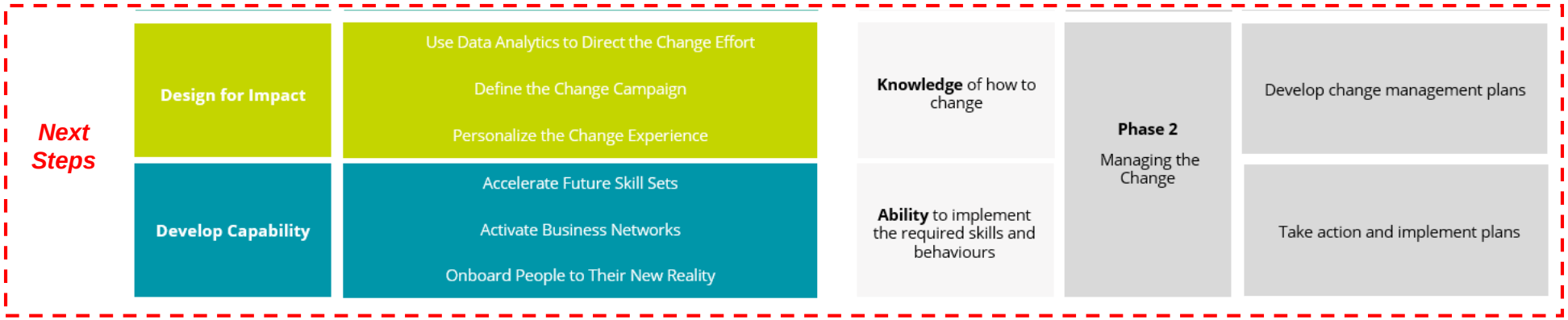
Overall Approach

Define Purpose
Visualize the business future, build the conditions for leader-led change, mobilize and engage communities

Activity	Description	Change Element	Frequency/ *Indicative* Timing
Stakeholder Meetings / Monthly Touchpoints	• Ongoing meetings with Lina and Jim to discuss progress to date and any relevant updates • ELT / EMT Meeting Scheduled October 25th	• *Mobilize and engage communities*	• Monthly
Implementation Roadmap Workshop	• Conduct a series of workshops with Town of Oakville stakeholders to identify the challenges, benefits, and key dependencies of all four programs	• *Visualize the business future*	• Once (Week of Oct. 11th)
Stakeholder Engagement Discussions	• One-on-one discussions with key stakeholders for awareness and buy-in of final deliverable (stakeholders include Ralph, Gabe, Jill and Julie) • Final deliverable provided as a pre-read	• *Mobilize and engage communities*	• Once
Sponsor Coalition Meeting for Final Deliverable Review	• Presentation to Sponsor Coalition on the Implementation plan for awareness, feedback and buy-in	• *Mobilize and engage communities*	• Once
Senior Management Team Presentation	• Meeting with the Town's directors and commissioners to capture an extended audience, educate on the project/best practices, and obtain feedback	• *Visualize the business future* • *Build the conditions for leader led change*	• Once (Oct. 25th)
GIS Day Presentation	• Presentation at the Town's GIS Day regarding Digital Twins and their application in municipal settings	• *Visualize the business future*	• Once (Nov. 16th)
Executive Leadership Team Presentation	• Meeting with Executive Leadership Team to obtain executive-level buy-in for the project	• *Build the conditions for leader led change*	• Once (Dec. 8th)

Key Activities Moving Forward | Implementation Plan

As the Town moves from *vision* to *implementation,* new change elements and approaches should be adopted to *Design for Impact* and *Develop Capability.*



Design for Impact
Use data analytics to direct the change effort, personalize the change campaign, shape the Future Working Model

Develop Capability
Accelerate future skill sets, activate business networks, on board people to their new reality

Activity	Description	Change Element	Frequency/ *Indicative* Timing
Define Change Management and Communication Strategy for Implementation of Digital Plan	• Create a detailed change management and communication action plan for the Implementation Plan that outlines the required change management and communications approach, delivery mechanisms, and channels for all stakeholders involved in the implementation of the digital plan.	**Design for Impact** • *Use data analytics to direct the change effort,* • *Personalize the change campaign*	• Once, with ongoing refinements as needed
Knowledge Transfer Approach and Plan	• Develop an approach and plan to conduct knowledge transfer between key stakeholder so that the Town of Oakville can continue to support the digital plan	***Develop Capability*** • *Accelerate future skill sets* • *On board people to their new reality*	• Ongoing

Communications Sub-Plan

Communications Sub-Plan

The Communication Sub-Plan provides an overarching view of the key activities and considerations used to effectively communicate and engage employees throughout the duration of the engagement.

Communication Vision: Empower and equip employees with an informed understanding of the digital vision and plan, and increase buy-in and overall alignment, while reducing resistance to change.

FROM DIGITAL VISION

- **Equip and empower leadership** with key messaging
- Develop **early communication** and **engagement opportunities** with key stakeholders
- **Promote** and **articulate** the digital vision and plan through engagement and education
- Develop messaging through **multiple channels** to increase awareness and readiness

...TO FUTURE STATE & IMPLEMENTATION

- An **informed** workforce equipped with knowledge
- A community of leaders **driving change** for **new digital property development services** in Canada
- A **highly skilled** future-ready workforce

The following guiding principles remained top of mind to ensure effective communication delivery:

1. Target **internal** audiences
2. Be agile, to allow for responsiveness and **quick pivots**
3. Be centralized and unified, so that there is **consistent messaging**
4. **Overall alignment** across all key stakeholders within the Town of Oakville

Communications Sub-Plan

The below outlines the communications efforts, **in priority order**, required for effective communication throughout the engagement

Tactic	Description / Details	Cadence	Audience	Channel
1. Property Development Digital Plan – Team Message	A communication providing an update on the digital plan engagement	One-time	Oakville Project Team	Email
2. Property Development Digital Plan – Leadership Kick off meeting	A meeting introducing the project to key stakeholders, providing insights into the potential future state of Oakville's digital property development services	One-time	Plan-It Sponsor Coalition	Meeting - Virtual
3. Current State Engagement Sessions				
a. Email Communication	Email communication for stakeholder engagement sessions	As-needed	Plan-It Sponsor Coalition, Executive Leadership Team	Email
b. Pre-read to Strategic Business Services	Pre-read material for engagement session	One-time	Oakville Project Team	Email
c. Engagement Sessions	Engagement sessions to further educate key stakeholders on the digital possibilities of Oakville's property development ecosystem, and gain better understanding of the current state of the Town of Oakville's property development services	As-needed	Plan-It Sponsor Coalition, Executive Leadership Team	Meeting – Virtual
4. Digital Vision and Ambition Deliverable				
a. Documented Digital Vision	A communication providing an update on the Town of Oakville's digital vision	One-time	Plan-It Sponsor Coalition	Email

Communications Sub-Plan

The below outlines the communications efforts, **in priority order**, required for effective communication throughout the engagement

Tactic	Description / Details	Cadence	Audience	Channel
4. Digital Vision and Ambition (continued)				
a. Engagement Session(s)	Engagement session(s) to validate the digital vision to key stakeholders within the Town of Oakville	As-needed	Plan-It Sponsor Coalition / Building / Planning / Transportation and Engineering	Workshop – In Person
b. Digital Vision and Ambition Deliverable	A deliverable documenting the Town of Oakville's digital plan and vision, including current state assessment, jurisdictional scans, digital vision and ambition	One-time	Plan-It Sponsor Coalition	Email
c. Digital Vision and Ambition Executive Summary	A high-level overview of the documented digital vision and ambition for internal circulation	One-time	Plan-It Sponsor Coalition	Distributor's Email
5. Digital Plan and Roadmap				
a. Digital Plan and Roadmap	A documented plan and roadmap outlining the potential future state of the Town of Oakville's property development services	One-time	Plan-It Sponsor Coalition / Building / Planning / Transportation and Engineering	Email
b. Engagement session(s)	Engagement sessions to validate the digital plan and roadmap to Strategic Business Services within the Town of Oakville	As-needed	Plan-It Sponsor Coalition / Building / Planning / Transportation and Engineering	Workshop – In Person

Communications Sub-Plan

The below outlines the communications efforts, **in priority order**, required for effective communication throughout the engagement

Tactic	Description / Details	Cadence	Audience	Channel
5. Digital Plan and Roadmap (continued)				
c. Workshop	A series of workshops to validate the digital plan and roadmap (all programs) and obtain feedback from key stakeholders within the Town of Oakville	As-needed	Plan-It Sponsor Coalition / Building / Planning / Transportation and Engineering	Workshop - Virtual
d. Pulse Survey	A pulse survey to leverage data around how key stakeholders are feeling about the digital plan / roadmap	One-time	Plan-It Sponsor Coalition / Building / Planning / Transportation and Engineering	Email
6. Implementation Roadmap and Digital Transformation Documents				
a. Documented implementation roadmap	A documented Implementation roadmap detailing how the Town of Oakville will deliver on the digital plan	One-time	Plan-It Sponsor Coalition	Email
b. Governance Model	A documented governance deliverable to execute the digital plan	One-time	Oakville Project Team	Email
c. 250-word abstract	A 250-word abstract describing the overall projects and key findings	One-time	Oakville Project Team	Email
d. SMT Presentation	A presentation to all directors and commissioners at the Town to review the digital plan, educate on potential opportunities, and obtain feedback	One-time	Senior Management Team	Meeting – Virtual
e. ELT Presentation	A presentation to the commissioners and CAO to go over the plan and roadmap and ensure buy-in a support for implementation	One-time	Executive Leadership Team	Meeting

Stakeholder Assessment

Stakeholder Identification | Impacted Groups

Key stakeholder groups with **important nuances / implications have been identified** and were called out in the change management and communication plan

1. **Executive Leadership Team** *(e.g., Commissioners, SPC, CAO)*
2. **Plan-It Sponsor Coalition**
3. **Building Services Department**
4. **Planning Department**
5. **Transportation and Engineering Department**
6. **Strategic Business Services Department**
7. **Asset Management Department**
8. **IT Department**
9. **Municipal Enforcement Department**
10. **Legal Department**
11. **Finance Department**

Stakeholder Identification | Impacted Groups

#	Stakeholder Group	Change Rating	Rationale
1	Executive Leadership Team	H	The ELT is responsible for green-lighting the proposal plan/roadmap and promoting it to secure funding and political buy-in. It is important that they understand the benefits and requirements for the program to communicate with decision makers.
2	Plan-It Sponsor Coalition	H	The Plan-It Coalition currently supports digital initiatives in the property development space and consists of directors and managers. This group will become the champions of change for their respective departments. Their visions and feedback must be incorporated into the plan and they must understand how their departments are affected to effectively communicate changes to their teams.
3	Building Services Department	H	Building Services is one of the core groups involved in property development and will be significantly impacted by the changes brought on by this program due to the introduction of new technology, new processes, new data opportunities, and new ways of doing business.
4	Planning Department	H	Planning is one of the core groups involved in property development and will be significantly impacted by the changes due to the the introduction of new technology, new processes, new data opportunities, and new ways of doing business.
5	Transportation and Engineering Department	H	Engineering is one of the core groups involved in property development and will be significantly impacted by the changes brought on by this program due to the introduction of new technology, new processes, new data opportunities, and new ways of doing business.
6	Strategic Business Services Department (SBS)	H	SBS will be responsible for overseeing and coordinating large parts of the proposed digital plan/roadmap. They must be engaged throughout to ensure that they are educated on and familiarized with the content of the plan/roadmap to allow for a successful implementation.
7	Asset Management Department	M	Though not directly involved in the property development process, there are numerous opportunities to capture information that is pertinent to Asset Management. It is important to coordinate with AM to ensure that they understand the benefits of this digital plan/roadmap and information requirements and other considerations are factored into the implementation of the plan/roadmap.

Legend: **Degree of Impact** H High M Moderate L Low

Stakeholder Identification | Impacted Groups

#	Stakeholder Group	Change Rating	Rationale
8	IT Department	M	IT will be responsible for implementing the technologies proposed by this plan/roadmap. They need to understand the changing business needs to ensure alignment between the technology implementation and the objectives to maximize the benefit the Town receives from the plan/roadmap.
9	Municipal Enforcement Department	M	Municipal Enforcement is involved in the property development process and relies on property development information in their daily operations. They must be made aware of the plan/roadmap and the changes it will bring to ensure that they can access the information they need and use the new technologies being proposed.
10	Legal Department	L	Legal has limited involvement with property development, but they are involved in certain areas including easements and titles. They will require access to certain property information but are not expected to have significant interactions with the proposed work.
11	Finance Department	L	Finance has minimal involvement with property development, but they are involved in certain areas. They will need to have access to certain information but are otherwise not expected to have significant interactions with the proposed work.

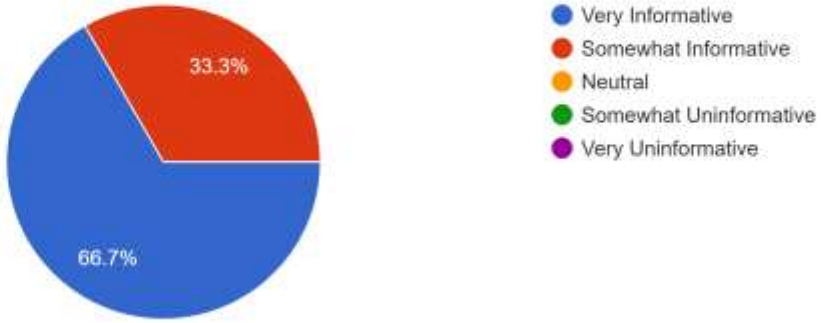
Legend: **Degree of Impact** H High M Moderate L Low

Stakeholder Engagement | Survey Feedback

A survey was completed following the completion of the Phase 2 Workshop to identify how stakeholders feel about the Digital Vision and Plan

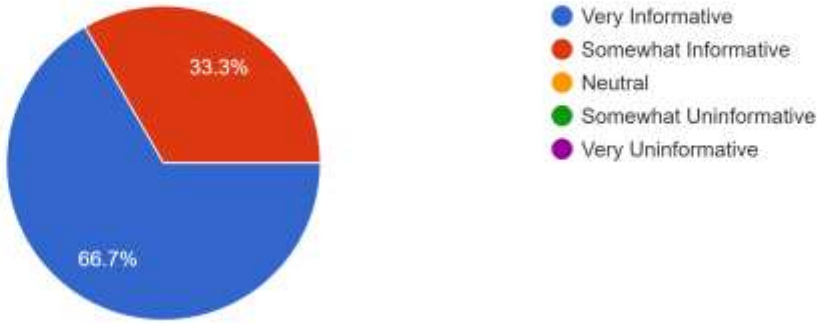
How informative did you find the workshop session?

6 responses



How informative did you find the workshop session?

6 responses



What do you believe are the top barriers preventing the successful delivery of the Digital Plan? Select all that apply.

6 responses

OAKVILLE

Property Development Digital Plan: A Digital Transformation Solution

Partnership Opportunities

AECO innovation lab

in partnership with

Deloitte.

Partnership Opportunities - Mitacs

AECO + Mitacs

AI-enabled Digital Twins for Automation on Regulatory Systems in the Built Environment

AECO is working with Mitacs to deliver a multi-year research project investigating how technology and automation can assist regulatory agencies in developing digital twins for their jurisdictions.

10 Sub-projects that include, for example, reviewing and automating processes and checks, BIM standards for municipalities, integration with GIS, and the use cases of Digital Twins in policy and planning applications.

Partnership Opportunities - CMHC

AECO + CMHC

Implementation of One Ontario in
Simcoe County and beyond

AECO has received funding from CMHC to develop a regional planning platform that will connect regional stakeholders to others in the development approval space.

CMHC encourages partnerships and the stacking of resources to ensure that the solution developed for Simcoe is scalable across the country. AECO is looking for other municipalities to contribute to these efforts to develop a wholistic view of the development approval process.

Housing Supply Challenge

NATIONAL HOUSING STRATEGY | STRATÉGIE NATIONALE SUR LE LOGEMENT

Défi d'offre de logement

October 24, 2022

Mayor Rob Burton
Town of Oakville
Cc: Chief Administrative Officer, Jane Clohecy,
Community Development Commissioner, Neil Garbe

Dear Mayor Burton,

I am pleased to confirm that AECO Innovation Lab Inc. has been identified as a funding recipient for the Housing Supply Challenge (HSC) Getting Started Round. AECO Innovation Lab Inc. was awarded a total of $2,346,275 to implement their project titled 'Pre-development Process Streamlining and Modernization in Support of Housing Affordability in Simcoe County: a scalable Proof of Concept solution for all regional governments in Canada'.

The HSC program has the overarching goal of reducing the barriers to housing supply and affordability. Through the Getting Started round, the program sought locally relevant solutions to improve the pre-development processes for housing that is affordable. All applications to the Round went through a competitive process, where applications were reviewed by an external panel of experts that provided final funding recommendations to CMHC. A total of 167 applications were received and, following a 2-stage application process, 14 funding recipients were provided with implementation funding. The program permits funding recipients to stack funding; however, duplication of funding is not permitted.

CMHC supports AECO Innovation Lab Inc. and their pilot project as a next generation development approval process system for municipal and regional governments across Canada. Their solution is based on international best practices and leading technological advancements localized for Canadian jurisdictions. The HSC encourages funding recipients to consider the potential to replicate or scale their solution in other communities and we are pleased to hear of the potential to expand their solution to the Town of Oakville.

We look forward to continuing to work with AECO Innovation Lab Inc. as they implement their solution across Canada.

Yours truly,

CANADA MORTGAGE AND HOUSING CORPORATION

Brigit Knecht
Senior Manager, Innovation & Partnerships

Canada

CMHC SCHL