BMROSS
engineering better communities

Township of Huron-Kinloss

COUNCIL TRAINING - PLANNING, DESIGN, AND CONSTRUCTION OF MUNICIPAL INFRASTRUCTURE ASSETS

PRESENTATION TO COUNCIL

MARCH 2024

Agenda

Introduction

a) BMROSS - Our Role

b) Council Training – Municipal Infrastructure Assets - Planning, Design, and Construction

Topics of Interest

1. Water Supply, Storage and Distribution
2. Approvals and Permits Pertaining to Water Systems
3. Wastewater Systems
4. Municipal Class Environmental Assessments
5. Municipal Guidelines for Infrastructure Design/Construction:
   a) Development Review
   b) Municipal Standards
      a) Roadways
      b) Stormwater Management
      c) Grading and Drainage
      d) Services
   c) Types of Development & Related Agreements
6. Bridge and Culvert Design and Approvals

BMROSS

COUNCIL TRAINING SESSION

B. M. Ross and Associates Limited

Team

- For over seventy years, BMROSS has been providing engineering services to communities throughout southwestern Ontario.
- BMROSS believes in a commitment to the places in which they live and work.
- Team includes more than engineers, technologists, planners, and surveyors….problem-solvers, facilitators, and negotiators.
- 3 Offices – Goderich, Mt. Forest, Brights Grove

Help

- Here to assist, provide support for both day-to-day and long-term activities related to the operation of the Township Assets.

Our Services

Environmental Assessments and Master Plans

Asset Management

Development Charges

Development Review and Assistance with Site Plan and Subdivision Approval/Acceptance Process including help with agreement preparation

Structural Inspections - OSIM

Design of Municipal Infrastructure Assets (New and Reconstruction)

- Roads and Drainage
- Water Supply Systems
- Wastewater Systems
- Bridges and Culverts

Water Supply, Storage and Distribution

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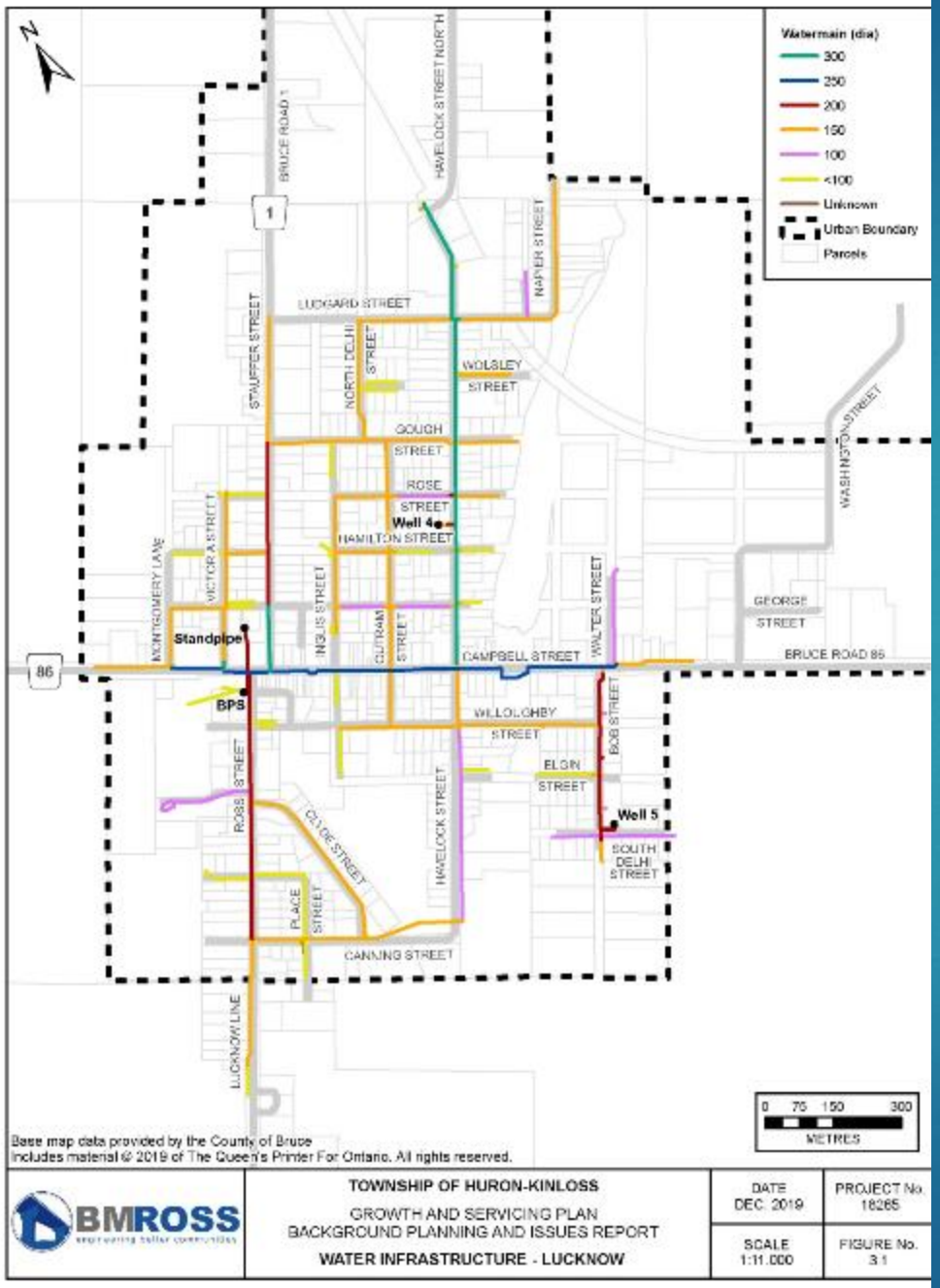
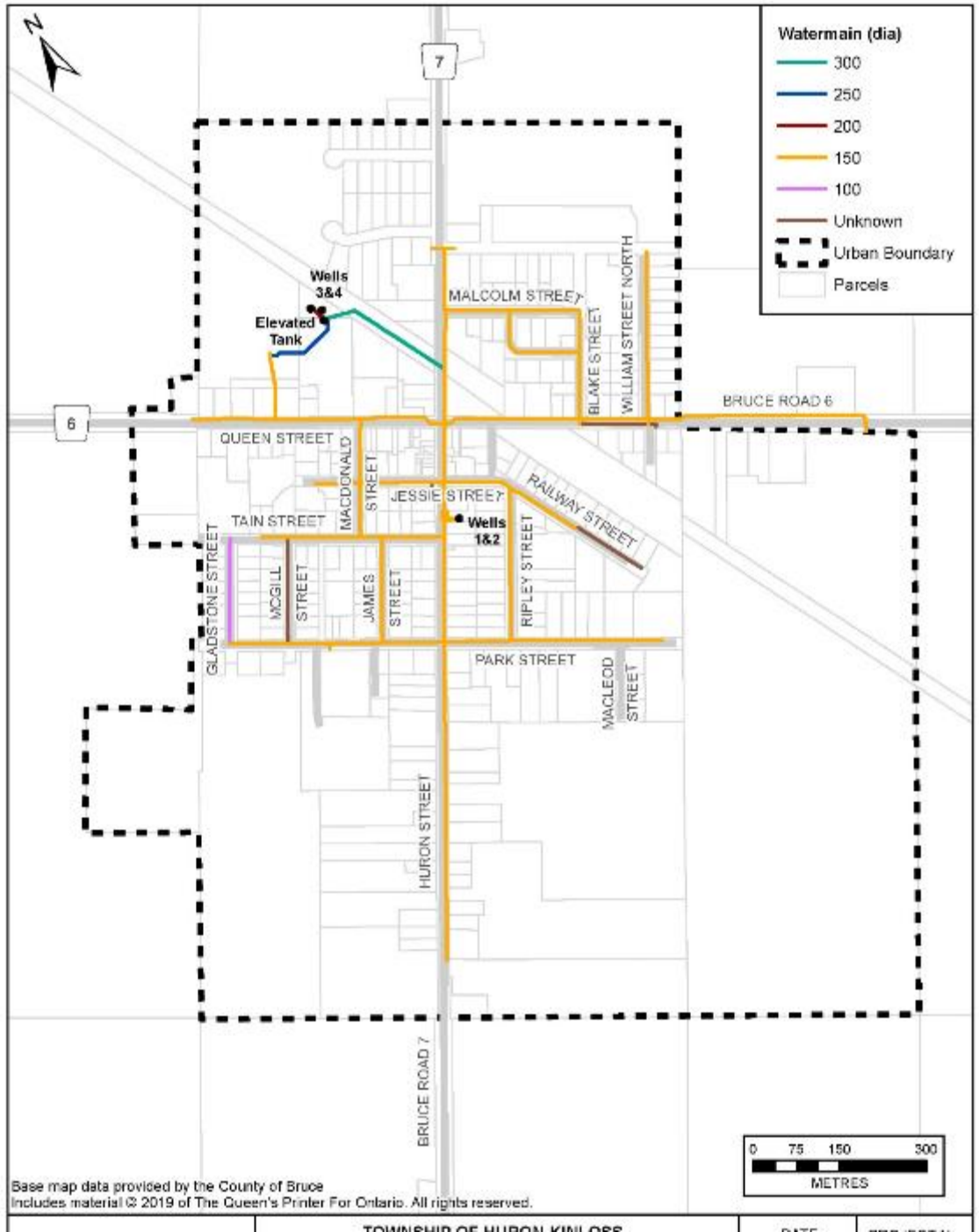
Lucknow System



- 2 wells
- New ET. Controls located with ET.
- Approximately:
  - 1,600 m^3 of storage 15 kilometers of watermain
  - 682 customers in Huron-Kinloss + 10 in ACW

Ripley Water System



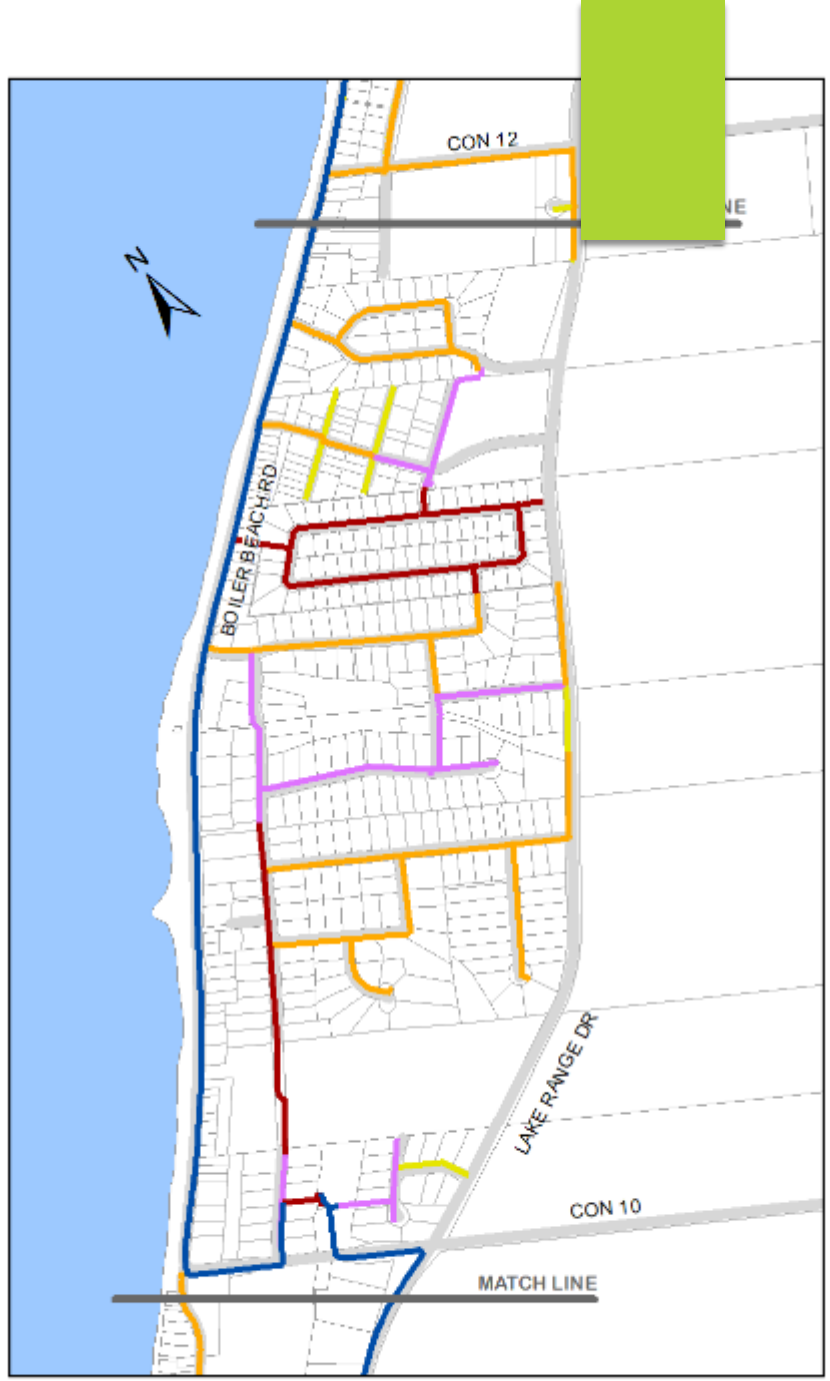
- 4 wells (Well 1 recently decommissioned)
- Treatment facilities located at Well 2 and the ET
- Approximately:
  - 4.5 kilometers of watermain
  - 366 customers
  - 1,465 m^3 of storage capacity

Lakeshore System

- Services lakeshore area south of Kincardine to Amberley Beach and Amberley.
- Three pressure zones (split at Concession 6 and Concession 10)
- 5 wells
- Approximately:
  - 80 kilometers of watermain
  - 2,443 customers
  - Standpipe with 1,500 m^3 of storage

Huronville Distribution System

- Kincardine is Operating Authority for the Huronville Subdivision Distribution System.
- Water in Huronville is supplied by Kincardine Water System.
- There is a connection between the Lakeshore System, the Huronville System and Kincardine System for emergency purposes.



Huronville Well

- Part of the Lakeshore System
- Connected to the Kincardine Drinking Water System
  - Can be used to supply Kincardine
  - Supplied Kincardine twice in 2022 to facilitate repairs to the Kincardine reservoir.
  - Pumphouse is isolated from the rest of the Lakeshore system when supplying Kincardine

Whitechurch System

- 2 wells
- A pumphouse housing treatment facilities
- Approximately:
  - 1 kilometer of watermain
  - 42 customers

Questions?

Approvals and Permits Pertaining to Water Systems

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Water Supply, Storage & Distribution

- The Ministry of the Environment, Conservation and Parks (MECP) issues:
  - Drinking Water Works Permit (DWWP),
  - Municipal Drinking Water Licence (MDWL), &
  - Permit To Take Water (PTTW)
- DWWP and MDWL go “hand-in-hand” to describe system, including capacity.
- Based on design capacity of the works.
- PTTW is required for wells and sets daily pump limits.
- MDWL states rated capacity of the Water Treatment Plant (WTP).

Huron-Kinloss's Systems

- HK has a MDWL, DWWP & PTTW for:
  - Ripley
  - Lucknow
  - Lakeshore
  - Whitechurch

About MDWLs, DWWPs & PTTWs

- The DWWPs and MDWLs must be renewed every 5 years.
- Huron-Kinloss's are due to be renewed by the end of 2025.
- Renewal must include an updated Financial Plan.

- PTTWs are due to be renewed every 10 years and as follows:
  - Ripley (May/27)
  - Lucknow (Sep27)
  - Lakeshore (varies; earliest Nov/24)
  - Whitechurch(Nov/25)

Other Requirements

- Raw water assessment to accompany the MDWL renewal every 5 years.
  - Verify GUDI or non-GUDI status
- Operators complete regular sampling and Annual Reporting.
- Some activities are pre-approved with requiring an amendment to the DWWP:
  - Form 1 – New watermain (under certain criteria)
  - Form 2 – Minor modifications (i.e. changing a pump)
  - Form 3 – Adding a generator

Questions?

Wastewater Systems

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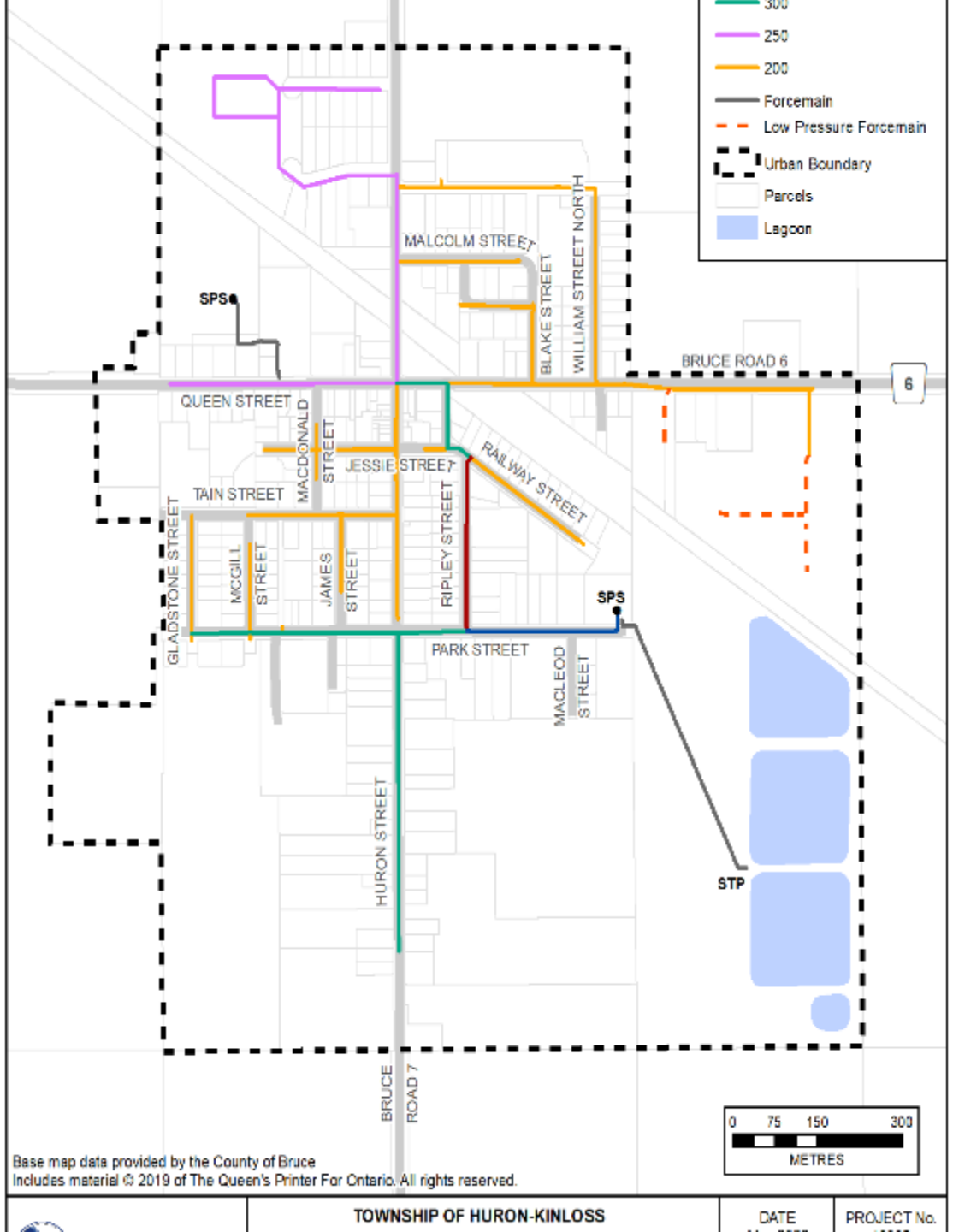
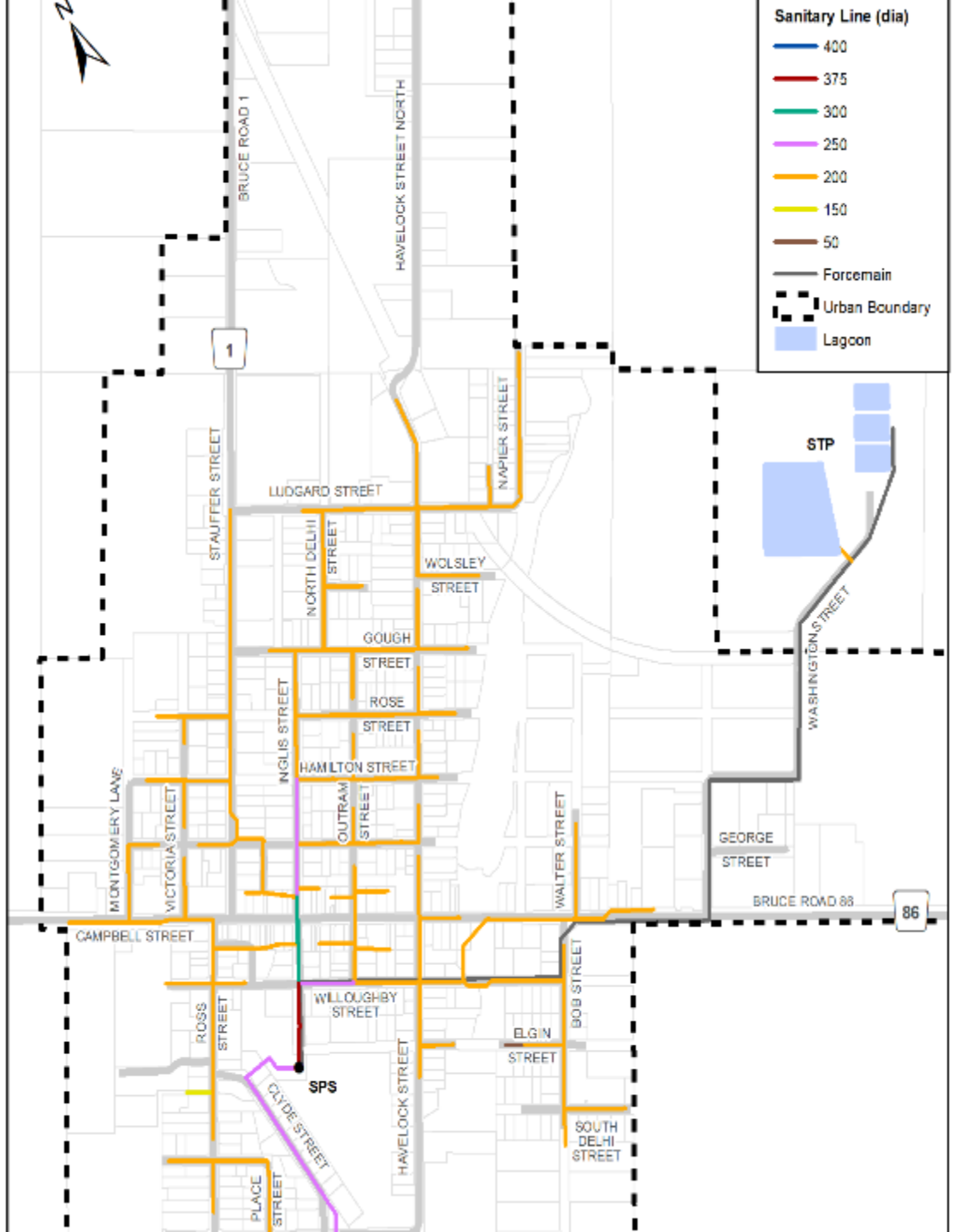
Ripley Wastewater System

- Lagoon-based system
  - 3 Stabilization ponds, 1 post aeration cell
  - Effluent discharged to the South Pine River between Oct 15th-May 1
- Capacity is 600 m^3/day
- 2 sewage pumping stations (Arena, Park St.)
- 366 customers



Lucknow Wastewater System



- Aerated lagoon system – 3 treatment lagoons, storage lagoon and six rapid infiltration basins.
- Capacity is 750 m^3/day
- Sewage pumping station at Inglis Street.
- 682 customers

Huronville/Inverlyn Lake

- Municipal sanitary sewage service provided by the Town of Kincardine

Questions?

Municipal Class Environmental Assessments 101

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The Lingo

- **EA** = Environmental Assessment
- **MCEA** = Municipal Class Environmental Assessment
- **Proponent** = who is undertaking the project or will have control of it (often, the proponent is a municipality).
- **Schedule** = categories of projects. Each schedule has specific requirements that must be met under the MCEA in terms of consultation, evaluations and documentation.

Municipal Class EA Process

- MCEA is the planning and approval process for municipal road, water, wastewater, stormwater and transit projects.
- The MCEA document sets out the process for how municipal infrastructure projects are planned and evaluated (i.e. how to do a Municipal Class EA)
- Class EA approach deals with projects that have the following characteristics: they are recurring, similar in nature, limited in scale, have a predictable range of environmental effects and are responsive to mitigation measures

Why Complete an MCEA?

Easy answer – because municipalities are required to for infrastructure works, under the EA Act.

Better answer – because it allows for the evaluation of feasible alternatives, it will identify potential impacts of a project and ways impacts can be mitigated and incorporates consultation into a logical and transparent decision-making process.

Key Principles of Municipal Class EAs

The Municipal Class EA process incorporates:

- Consultation
- Consideration of alternatives
- Identification of effects and impacts
- Systematic approach for groups of similar projects
- Documentation/transparency of the decision-making process

Municipal Class EA Schedules

Exempt

New or replacement well at existing well site where existing rated yield is the same

Exempt following screening

New well at an existing municipal well site

B

New well at a new municipal well site

C

Expand a water treatment plant beyond rated capacity

Fewer or more predictable impacts → Greater potential for impacts

Less complex, fewer alternative solutions to consider → More complex project, more potential alternative solutions

Exempt → Requires Archaeological Screening → Requires Project File → Requires Study Report

Consultation

- Key component of MCEA process.
- Required to consult with:
  - Provincial and federal agencies (depending on project)
  - First Nation and Métis communities
  - Adjacent property owners
  - Stakeholders and the general public
- At least two mandatory points of contact for a Schedule B project
  - Initial Project Notice
  - Notice of Study Completion
- Depending on the level of interest or impacts associated with a project, one or multiple public meetings may be needed.

Associated Studies

- May need to be completed during the EA process
- Need for additional studies will depend on the project, location and adjacent land features/uses.
- Can add time and costs to process.

Often site-specific studies are completed as part of the EA to identify impacts and mitigation measures

May include:

Archaeological Assessment	Natural Environment Assessments and/or Species at Risk Studies	Cultural Heritage Assessment	Transportation or Traffic Impact Studies	Air and Noise Impact Assessments

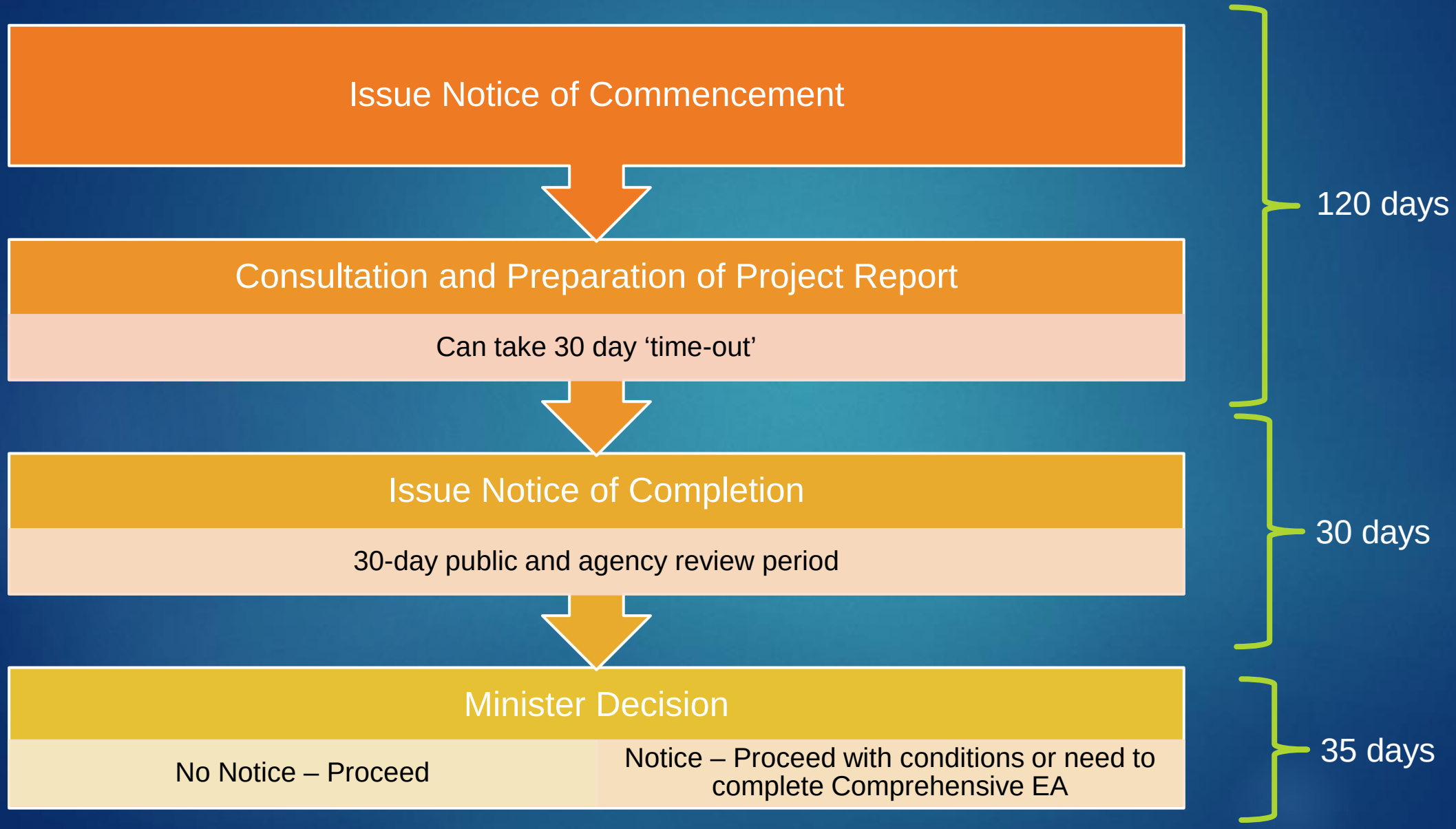
Master Plans

- Master Plans are long-range plans that integrate infrastructure planning, land-use planning and the MCEA process.
  - At a minimum must complete Phases 1 and 2 of the MCEA process.
  - Examples: water and wastewater master plans, transportation master plan, servicing master plan .
- There are a number of approaches to Master Plans that can be used, depending on how in-depth investigations go.
  - Can be broad, high-level plans to guide future work.
  - Can go into sufficient detail to fulfil requirements for Schedule B and C projects identified.

Proposed Changes to the EA Act

- Province is proposing to revoke the MCEA in favour of a project 'Project List' approach.
  - Only projects on the Project List will be required to complete the Municipal Project Assessment Process (MPAP).
  - Generally, only projects currently classified as Schedule C are proposed for inclusion on the Project List.
    - New drinking water and wastewater systems, expansions of wastewater systems by 25% of more of rated capacity, new wastewater systems over 50,000 L/day of rated capacity, new shoreline works (breakwaters, groynes, seawalls).
- Also proposing a mandatory timeline for completing the MPAP.
- No requirement for private developers to complete an EA/MPAP for anything.

MPAP Proposed Process and Timelines



What does it mean for municipalities?

- As currently proposed, there will be significantly fewer EAs in the future.
- When you do have to do an EA…
  - Significant work will be needed to be completed before the MPAP process is started due to the mandatory timelines. Any studies (e.g. archaeology, natural heritage, assimilative capacity) will need to be completed before process is started.
  - Is the preferred solution identified and decided upon before you start the MPAP? Probably....
- “Municipalities may continue to carry out master servicing planning under their own processes to assess planned municipal infrastructure“
- Stay tuned….commenting period on proposed changes ends March 17, 2024

Questions?

Municipal Guidelines for Infrastructure Design and Construction

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Agenda:

1. Development Review
2. Municipal Standards
3. Site Plan and Subdivision Agreements

Development Review

What do we do:

- Assist the Township in reviewing and approving appropriately planned and designed development proposals.
- In HK there has been an increased interest in Residential Development.
- Often require the creation/construction roads and servicing that the municipality will eventually assume.

Steps:

- Preconsultation
  - A meeting with developer and his professionals, Township staff, planners, County/MTO (if roads are impacted), fire department, Conservation Authority, municipal engineer, sometimes others.
  - Discuss developer’s dreams, draft proposal, provide requirement for planning application, studies, discuss servicing needs and constraints, review Stormwater Management (SWM), and discuss possible external works.
  - To help get developer on right track.

Studies – may include

- Traffic impact
- Stormwater management
- Archeology
- Geotechnical
- Environmental Impact/ biology/ tree assessment/ species at risk
- Slope stability

Servicing Capacity:

- Water
  - Domestic and fire flow demands
  - Distribution and supply
  - Supply – total capacity and reserve capacity
- Sewage
  - Capacity for treatment WWTP
  - Capacity of Pumping Stations and Forcemain
  - Capacity of Collection Sewers

During developer's design

Discuss servicing options and constraints with staff

Answer questions from developer's engineer

- Provide information
- Assist in design decisions on occasion

Wait

Site plan submission

- Depending on site may include, in addition to the planning application documents:
  - Studies
  - Site grading plan
  - Site servicing plan
  - Stormwater management report and plans
  - Erosion control plans
  - Plans of municipal infrastructure, roads, sewer, water, etc.
  - Lighting, landscaping, utility details

Review would normally include:

- Review of grading, review of influences from and impacts on adjacent parcels.
- Review of surface drainage on site and Stormwater management (SWM)
- Review of SWM report and consultation with Conservation Authority (CA) if appropriate.
- Review of location, often size and materials for onsite services, sanitary, water, storm

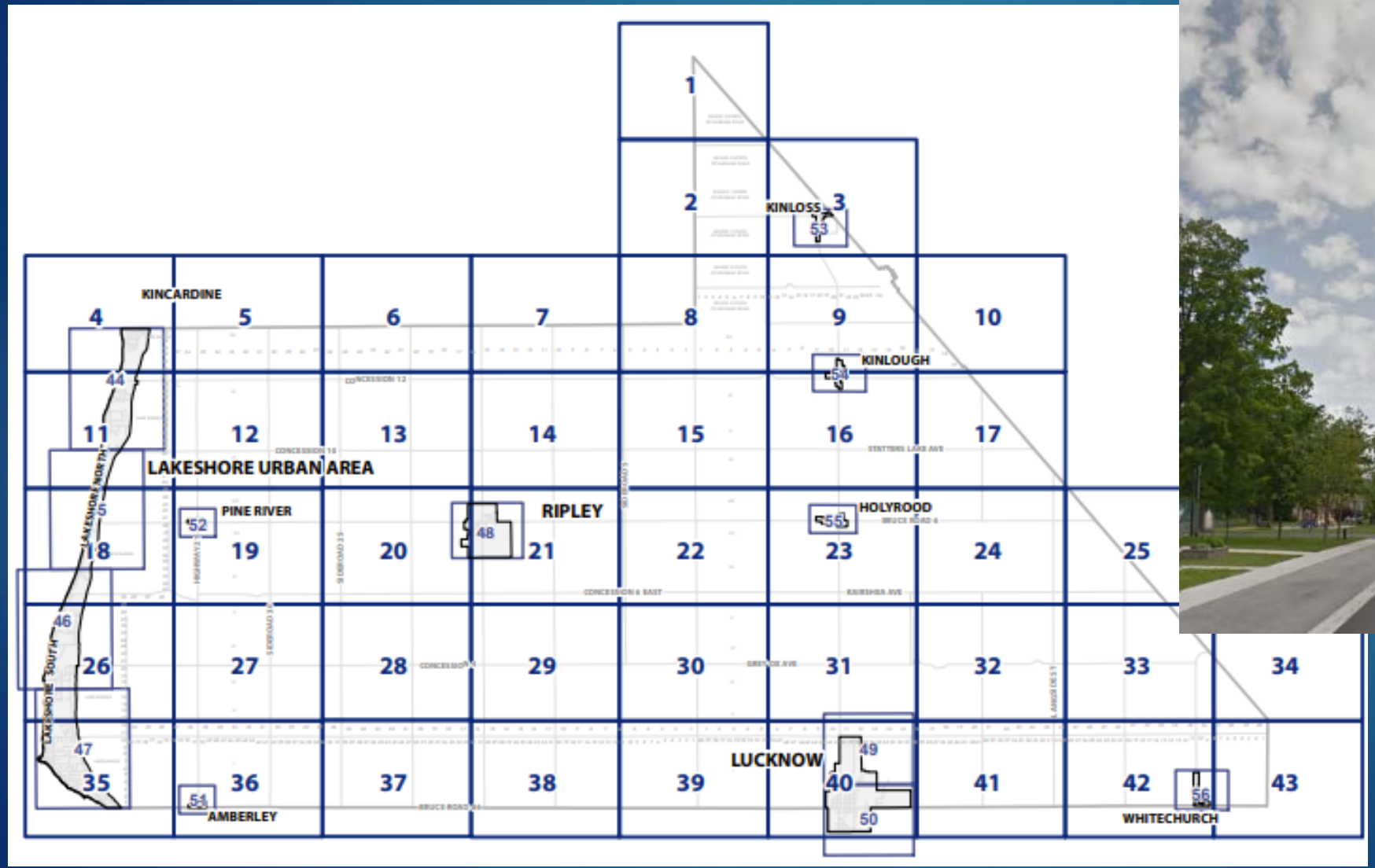
Review would normally include (cont'd):

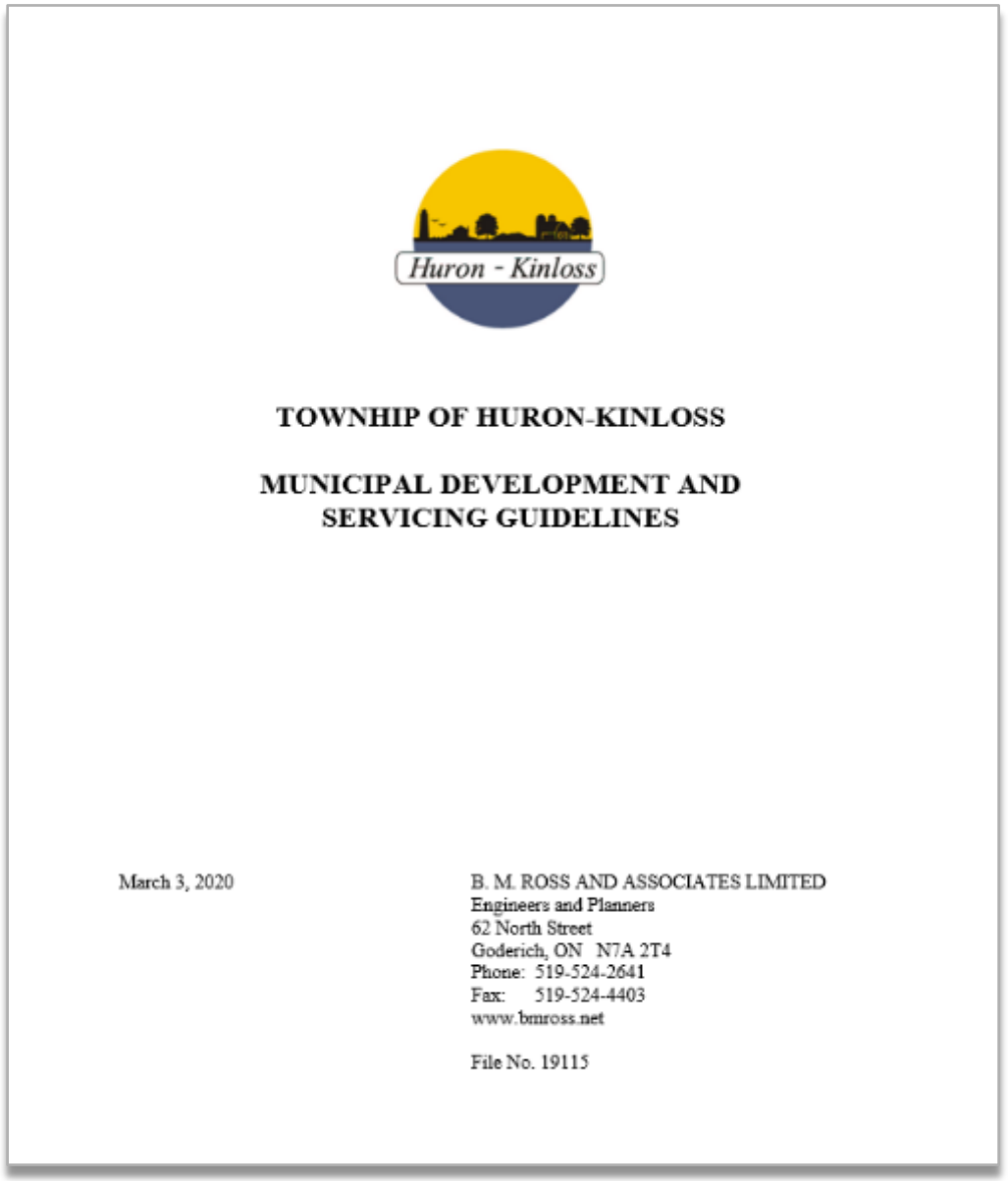
- Review of design of municipal infrastructure
  - Roads or road extensions
  - Storm sewer
  - Sanitary sewers
  - Water distribution
  - Utility locations
- Other items
  - Assistance with writing site plan and/or development agreements, calculation of security requirements

Post Approval

- Assist municipality with inspection of work if requested
- Assist with review of securities when requested
- Volume of this work is often quite limited

Servicing Standards





TOWNHIP OF HURON-KINLOSS

MUNICIPAL DEVELOPMENT AND SERVICING GUIDELINES

March 3, 2020

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File No. 19115

STANDARDS ARE NEEDED TO PROVIDE CONSISTENT, APPROPRIATE DEVELOPMENT OF SITES THAT ARE BUILDING SERVICES THAT WILL BE MUNICIPALLY OR PRIVATELY OWNED.

Municipal Standards

MUNICIPALITIES SHOULD HAVE STANDARDS AND APPLY THEM CONSISTENTLY.

Standards for:

- Roads
- Storm sewers and stormwater management
- Grading and surface drainage
- Water distribution and service
- Sanitary sewage collection
- Sidewalks and surface works
- Utilities – phone, hydro, gas, cable, etc.

Road Standards

Throughout time road standards have adapted to the transportation methods of the day.

Since the time of the Romans, roads have been built to recognize the importance of an efficient transportation system.

Modern roads must serve a purpose – they must be structurally sound, and of sufficient width.

AND THE CONSTRUCTION MUST LOOK AT HOW THEY WILL BE MAINTAINED – AND:

Their relationship with the surrounding environment, especially drainage issues, is vital.

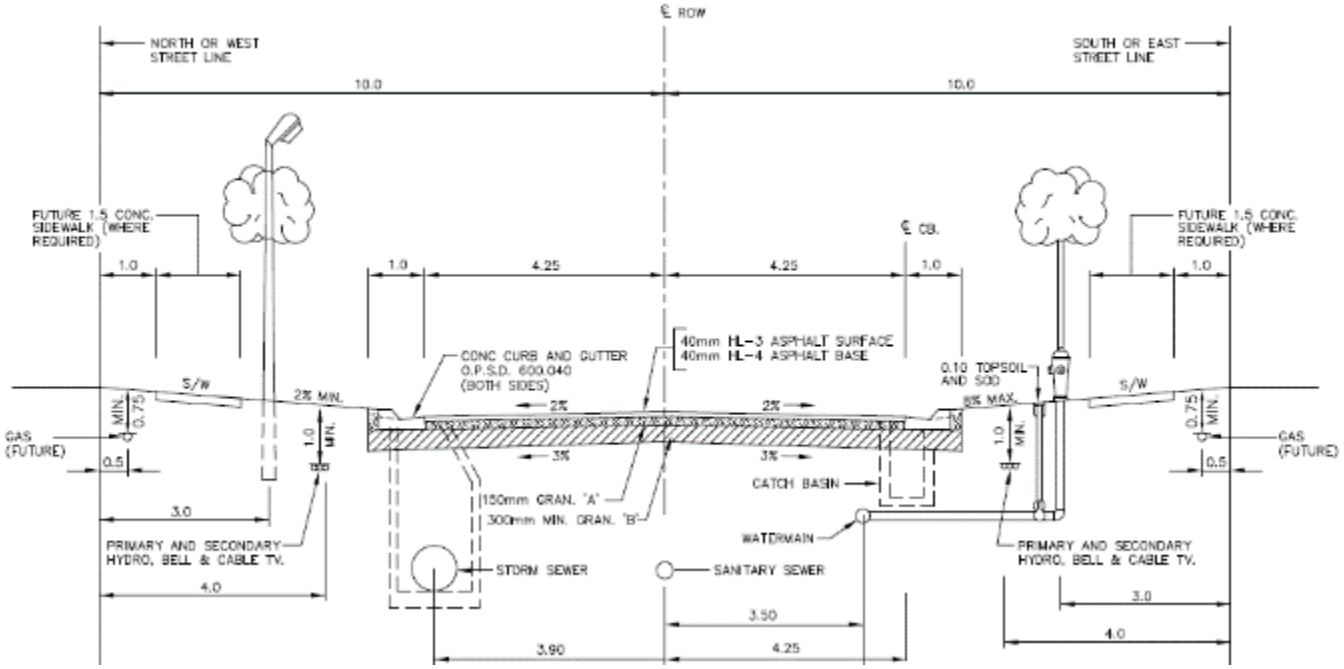
Ontario MTO

- Established standards for road design; and established standards for new residential roads in subdivisions.(1960's)

- At that time the standards for new roads: (3)
  - Cottage roads - <50 V.P.D.
  - Suburban roads – frontages > 100 ft.
  - Urban roads – frontages < 100 ft.
  - Until the roads subsidy disappeared, these standards had to be used by Ontario municipalities to maintain their subsidies.

Standards

Since the early 1990's, municipalities have had much more freedom to establish standards. **All** of the municipalities we are associated with have established policies similar to the old MTO standards but most (including HK) have adopted the urban standard for any new development.



Urban Roadway and Cross-Section:

- 20 M. ROW
- 8.5 M. SURFACE
- CURB AND GUTTER
- STORM SEWERS
- ASPHALT SURFACE
- UTILITIES

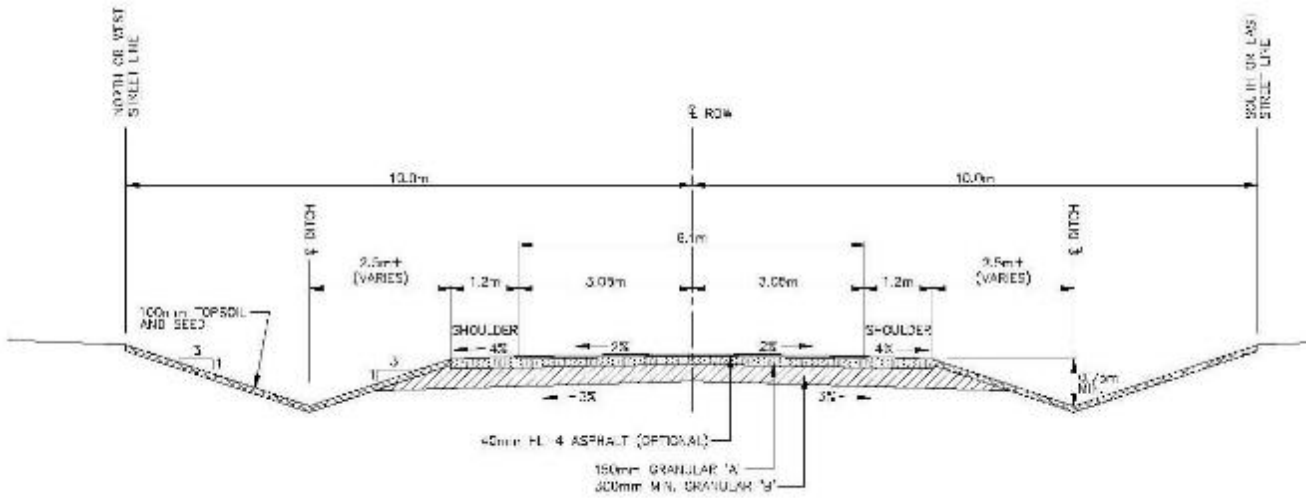
Cross-Sections

In the past, and even sometimes now in estate type developments, the suburban cross-section has been utilized.

The suburban cross-section is not preferred and it hasn’t been included in the HK standard but you do have some historical developments where it exists.

Suburban Roadway and Cross-section:

- 6.0-7.0 m. Surface
- 1.2 m. Shoulders
- Rural cross section
- Some storm sewer
- Paved surface
- Some utilities



Suburban Issues:

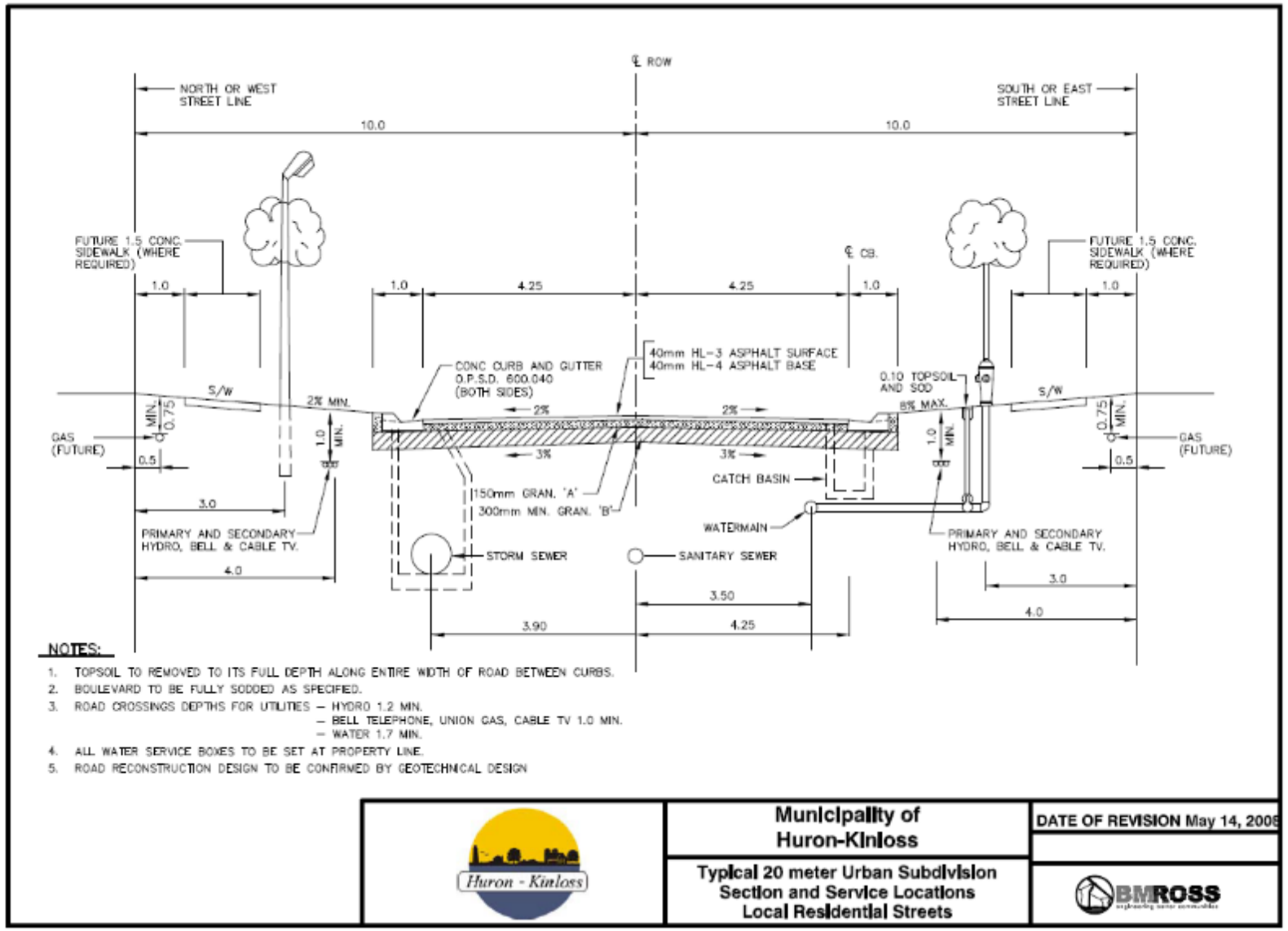
- Problems with drainage and conversion.

Urban Advantages:

- Clean, neat
- No ditch maintenance
- What a lot of people want
- Same as what your neighbours are doing.

Huron-Kinloss Cross-Section

- Considerations:
- Sidewalk and street light location
- Utilities – communications, gas, hydro, etc.



Storm Sewers and Stormwater Management

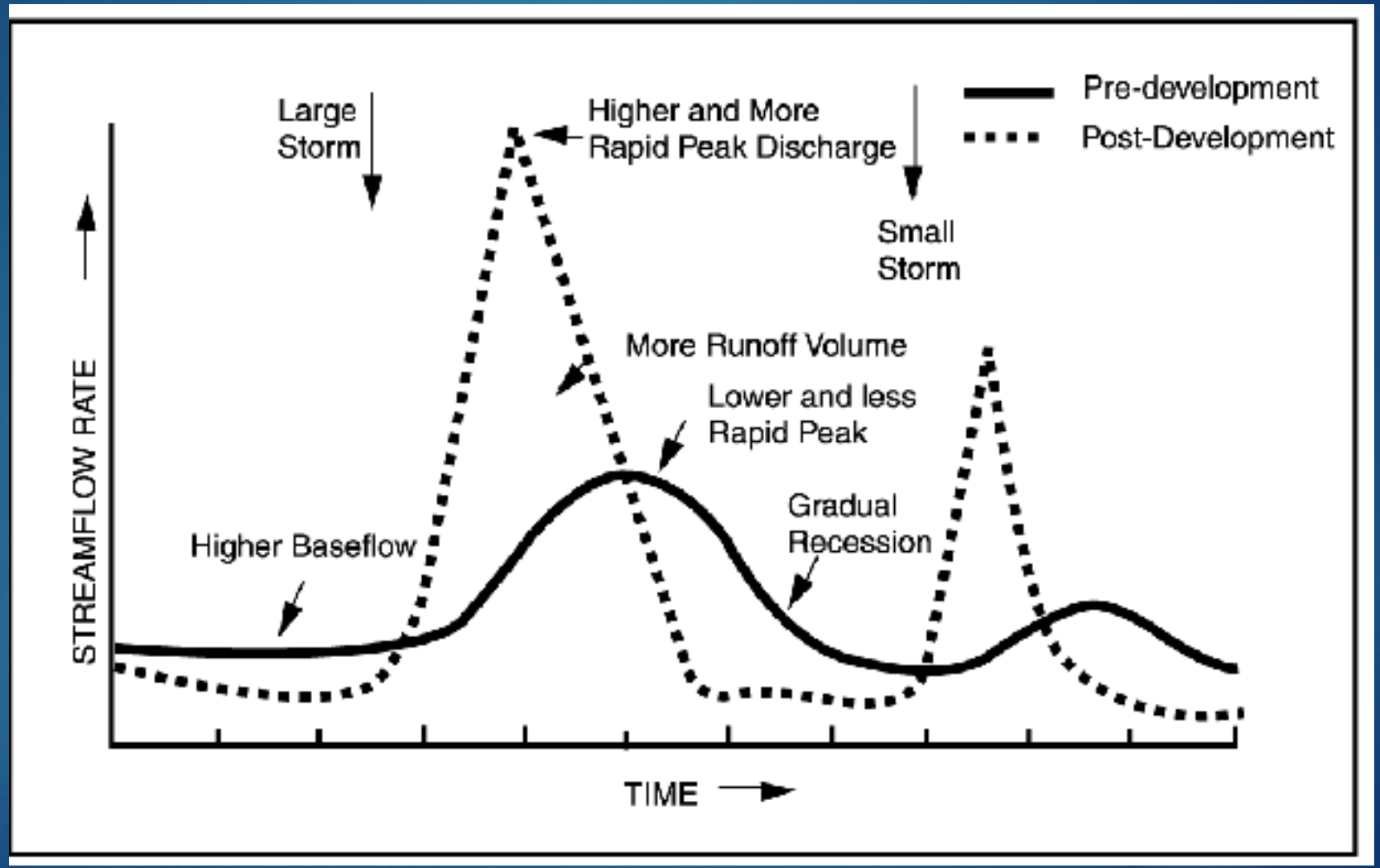
- Storm Sewer Design:
  - Storm sewers are designed for what we call the minor storm – generally the 5-year storm.
  - Larger events should be handled with overland flow.

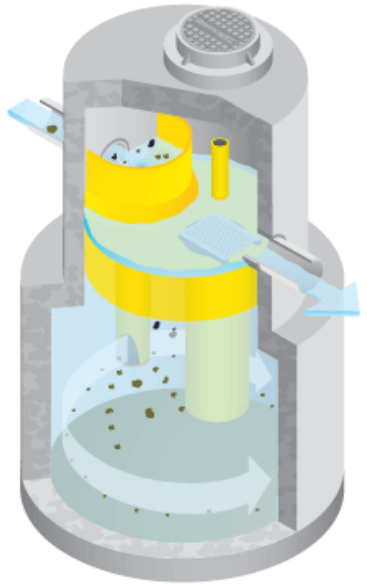
Stormwater Management

- Deals with stormwater quantity and quality. Storm discharges are to be limited to peak flow rates which do not exceed pre-development peaks. The quality of stormwater is improved by providing opportunity for sedimentation.

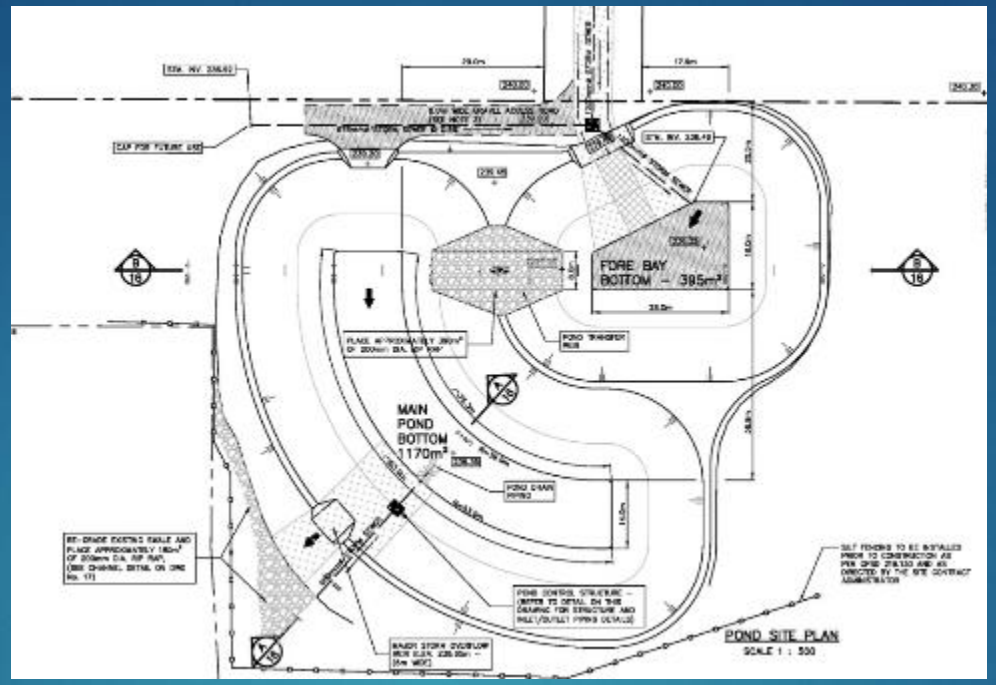
- Why do we worry about it?

Quantity Control



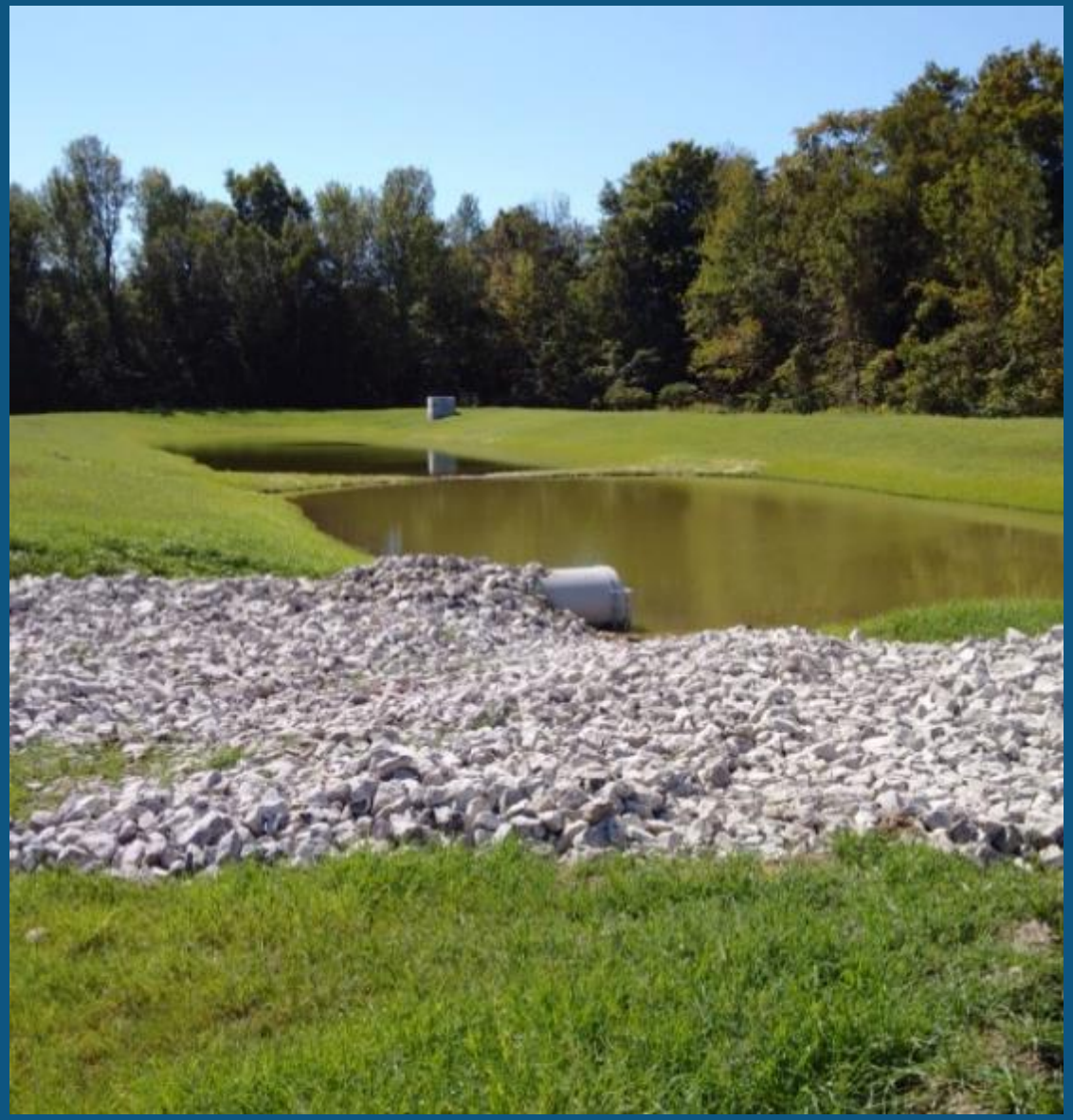


Quality Control


FORE BAY
BOTTOM – 395m²
MAIN
POND
BOTTOM
1170m²
POND SITE PLAN
SCALE 1 : 500


11/03/201


11/03/2014 14



Low Impact Development (LIDS)

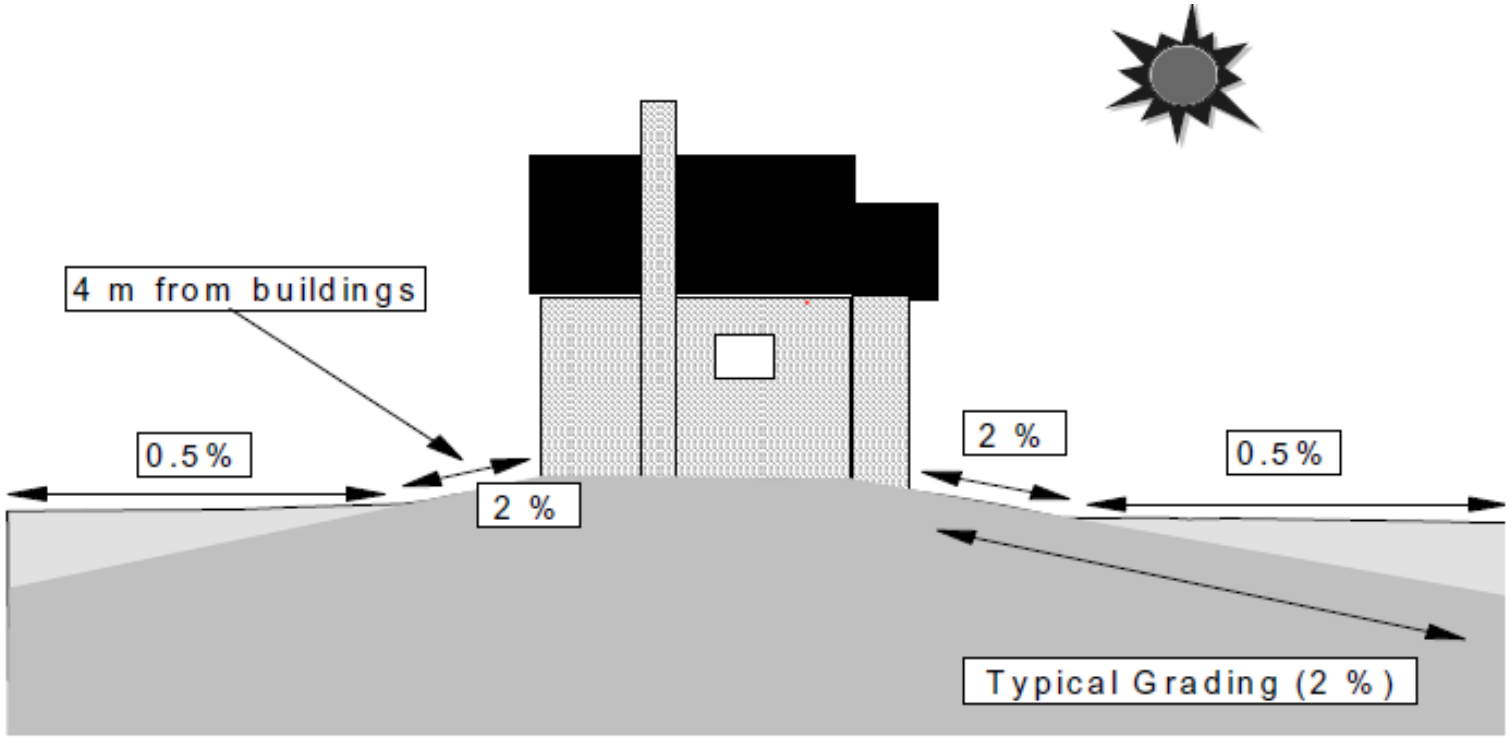
Both the MECP and the Conservation Authorities are asking that some form of Low Impact Development be considered as part of new or redeveloped sites.

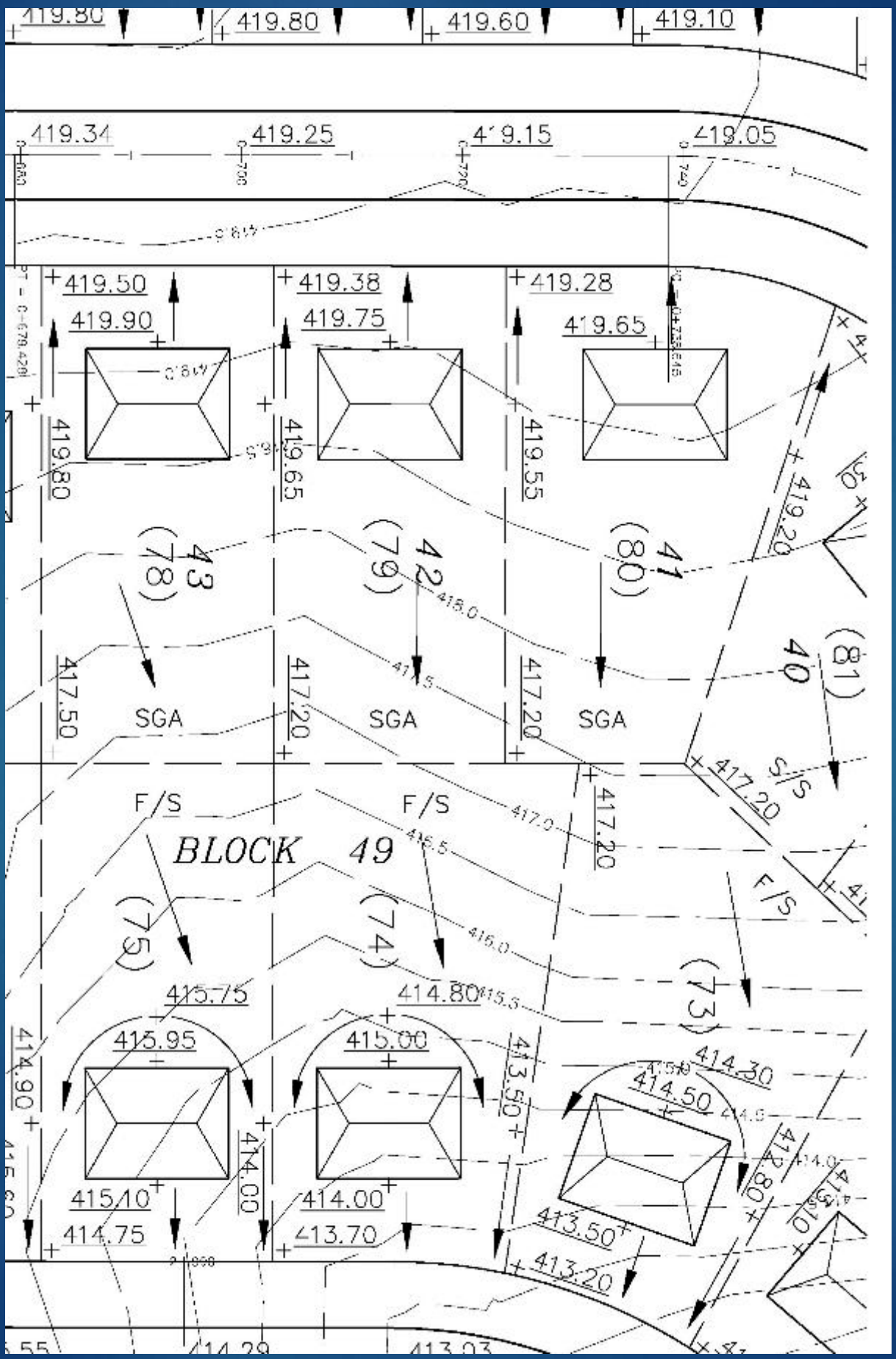
In the coming years, municipalities will be including provisions for this approach in their standards.

LIDs


RAIN GARDENS
AT WORK

Grading and Drainage

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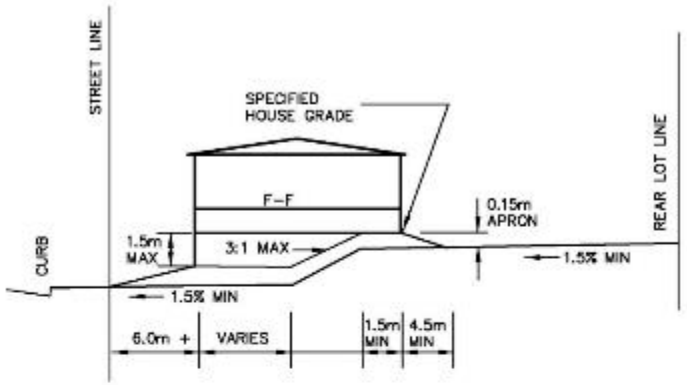
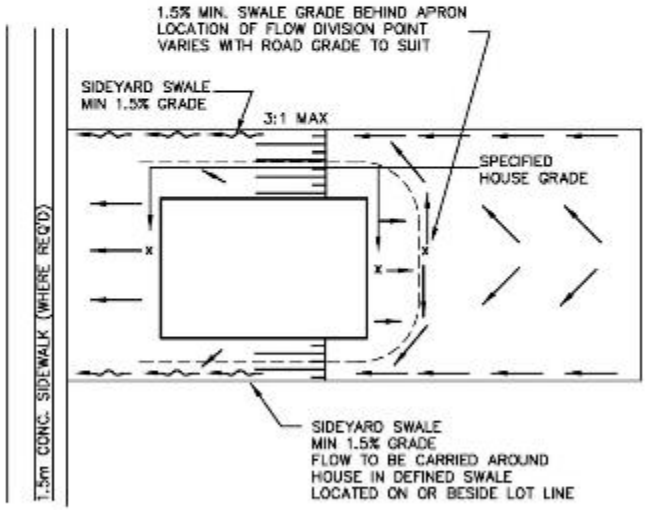
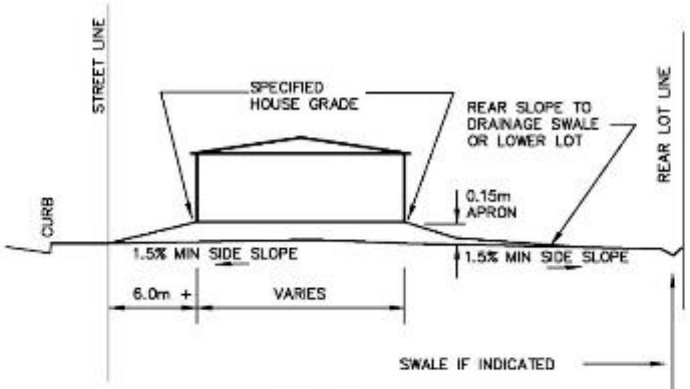


ELEVATION

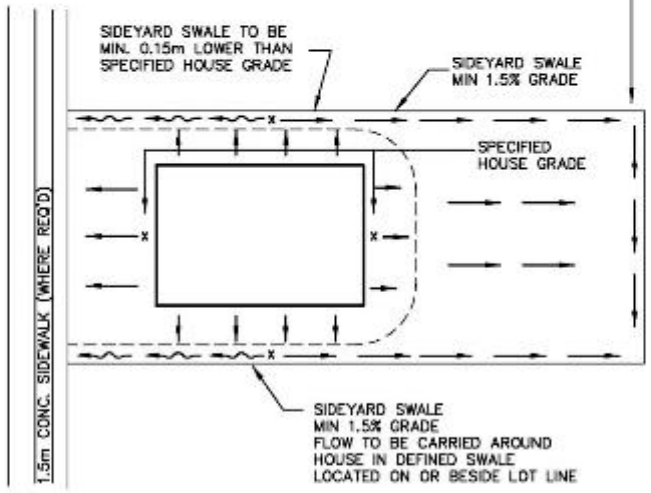


PLAN

BMROSS engineering better communities	BMROSS STANDARD DRAWING	DATE OF REVISION - Jan, 2004
	Front Split Lot Drainage	SCALE : N.T.S.
		DRAWING No. 231



ELEVATION



PLAN

BMROSS engineering better communities	BMROSS STANDARD DRAWING	DATE OF REVISION - Jan, 2004
	Typical Rear Lot Drainage	SCALE : N.T.S.
		DRAWING No. 232

Sanitary Sewers and Watermains – MECP Guidelines, OPSS & OPSD

COUNCIL TRAINING SESSION

Sanitary Sewers are designed for:

Flow from predicted sources

Extraneous flows – I/I allowance (inflow/infiltration)

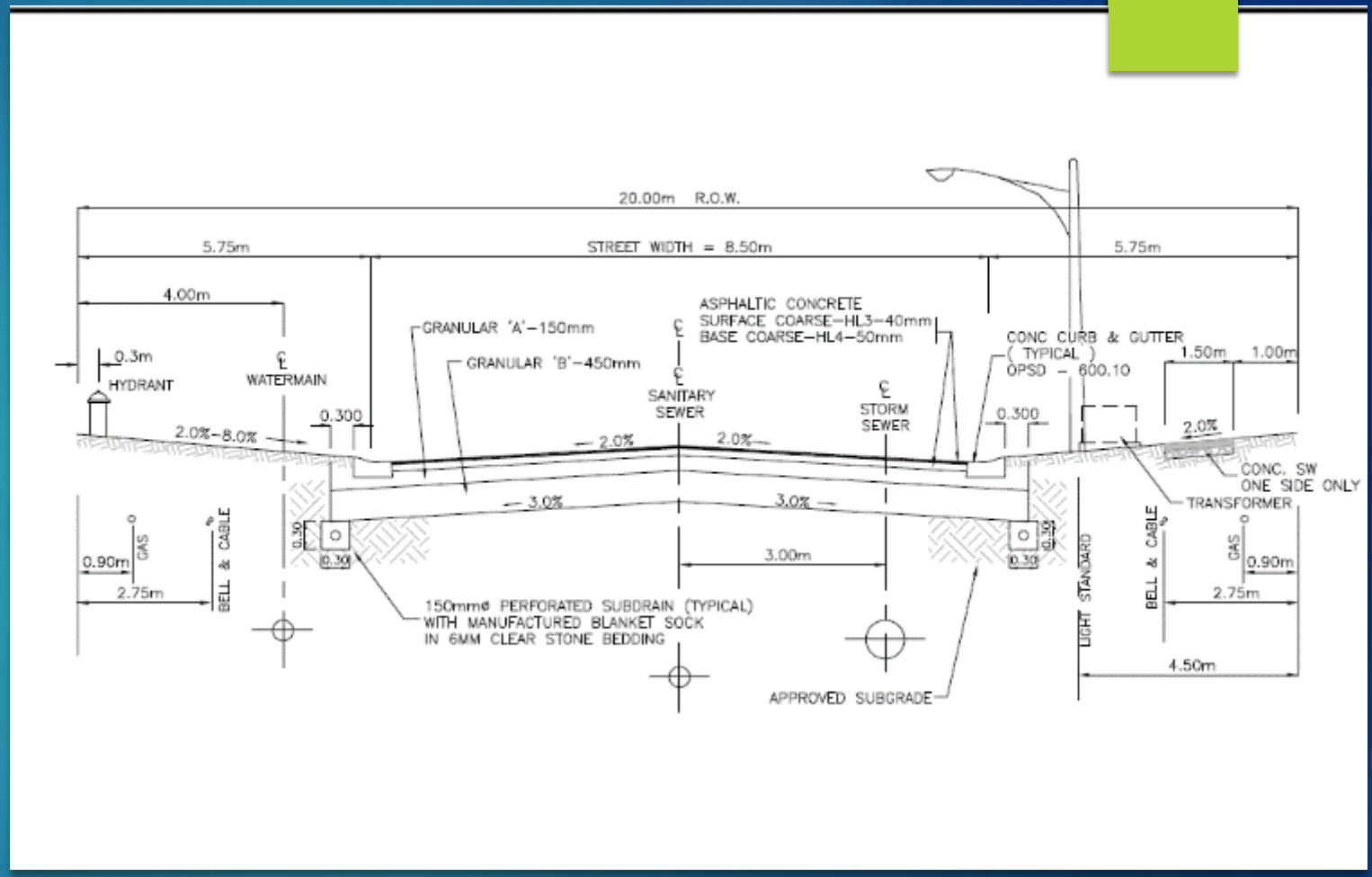
Water distribution

Flows for predicted peak demands

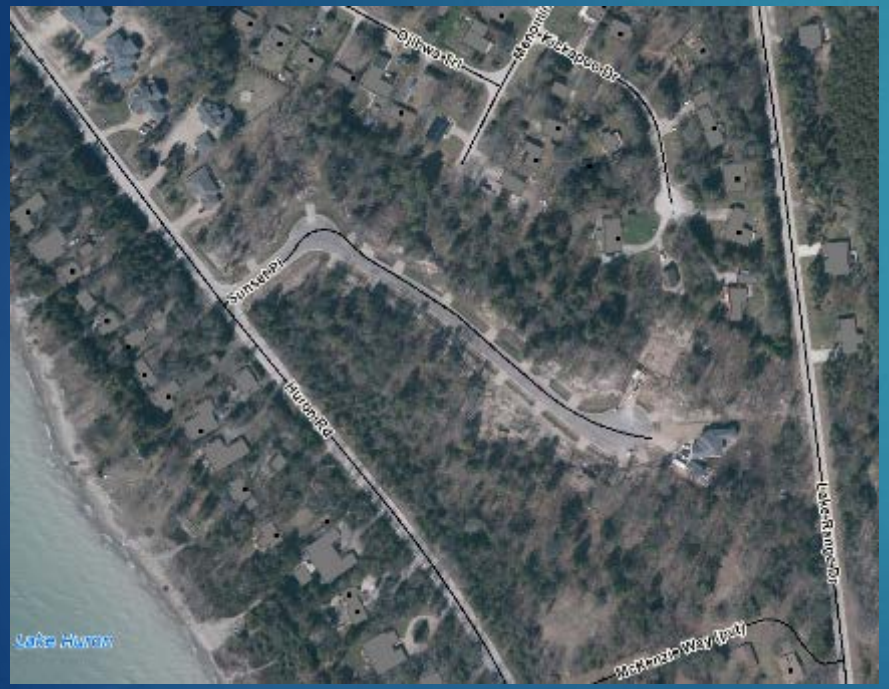
Fire flows

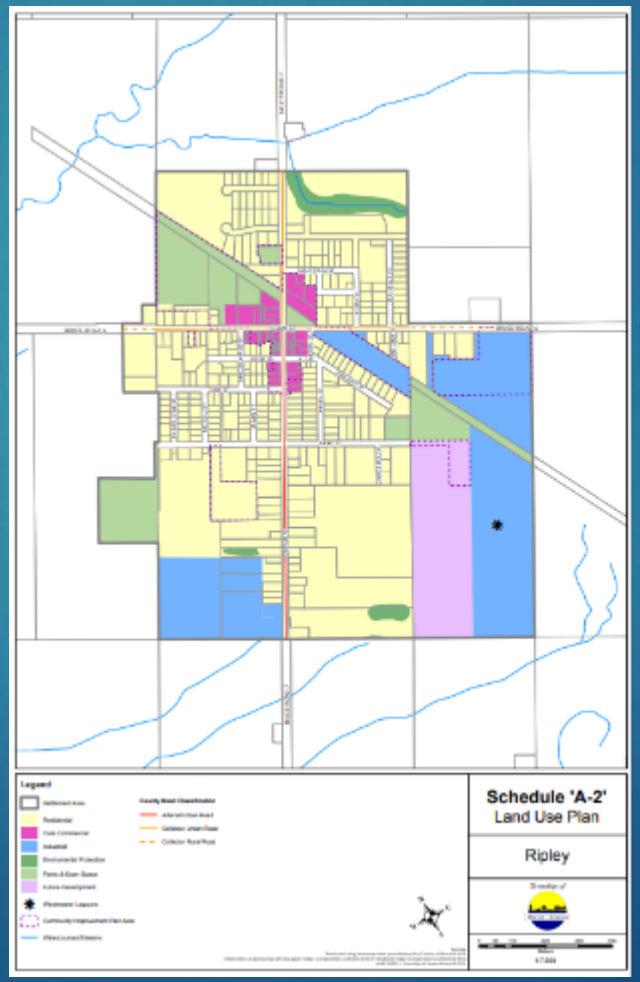
Utilities

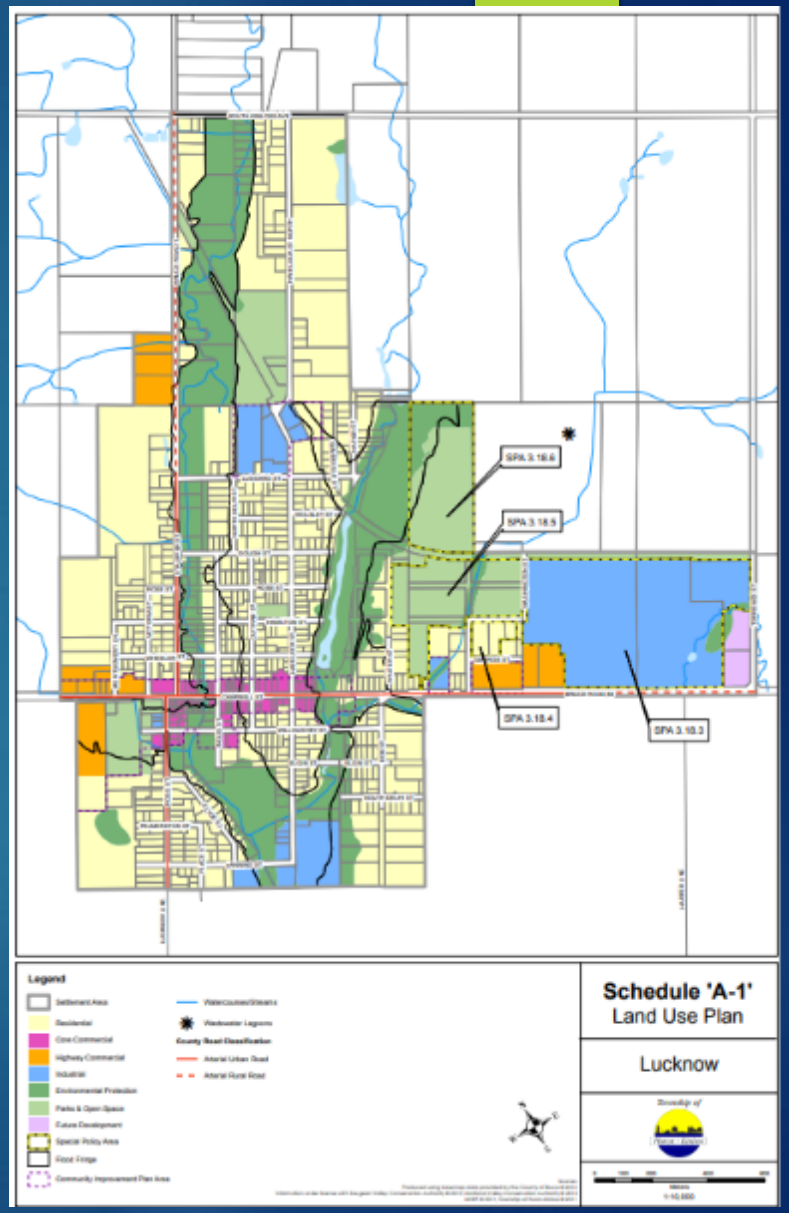
- Defined corridor and location is important.
- Timing for installation.
- Agreement defines when they need to be in place during the phases of construction – required for occupancy!



Types of Development and the Related Agreements







Development – Subdivisions, Condominiums, Site Plans

- Types of development
- Subdivision agreements
  - Permits/occupancy
  - Stages of servicing/acceptance
  - Warranties
  - Cost sharing/ Oversizing
  - Final Acceptance/Assumption

Planning Processes

- PPS – Provincial Policy Statement
- Official Plans
- Zoning bylaw
- Creation of lots/units
  - Consent
  - Part lot control
  - Subdivision
  - Condominium

Development:

- Building permit on infill lot
- Site Plan (agreement)
  - from the simple to the extremely complex
- Subdivision
- Condominiums often start as site plan agreements – condo created later

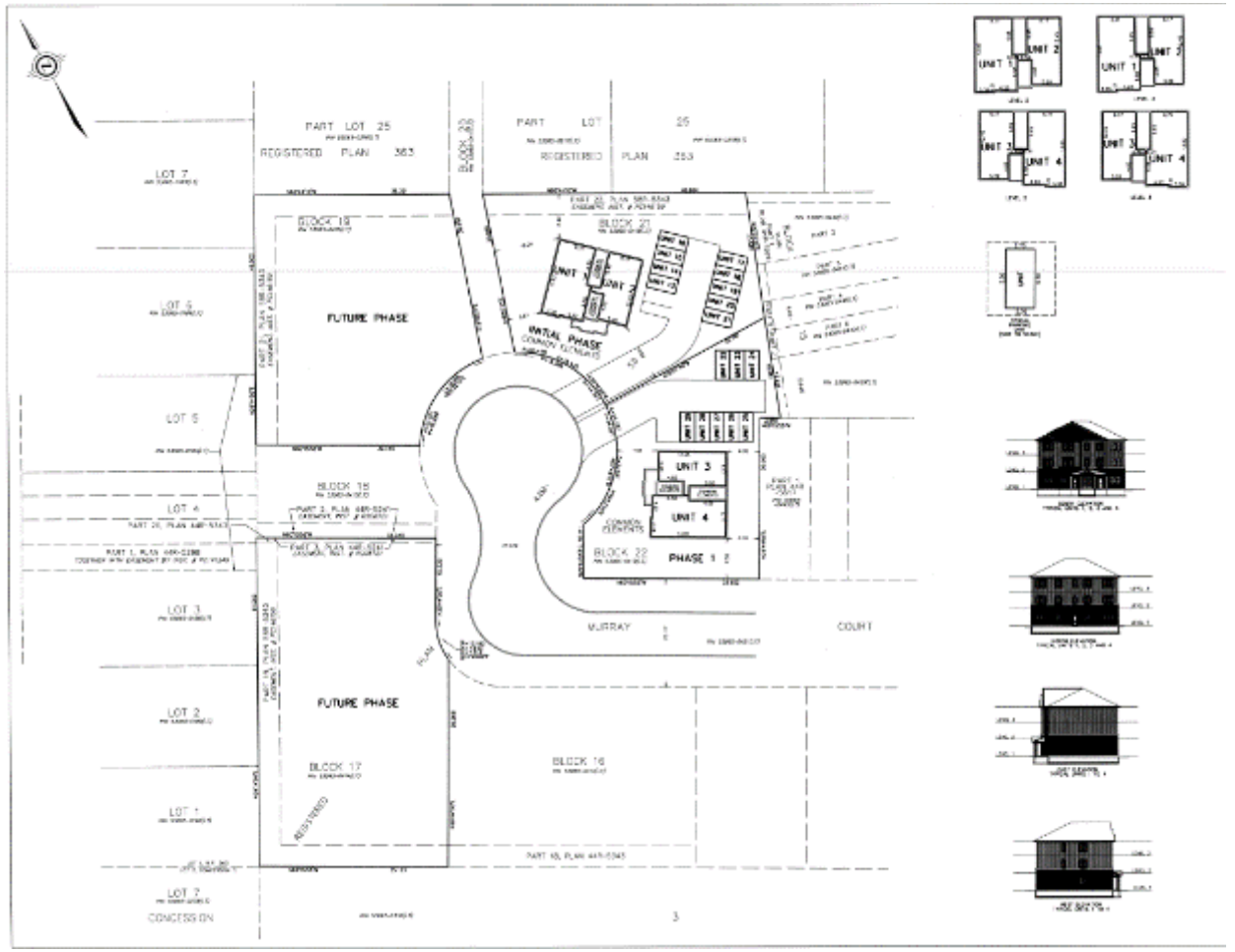
What is a Site Plan/Site Plan Agreement?

A signed agreement that is registered on title (forever) that requires the Owner, initial or future, to have buildings and appurtenances in accordance with an approved site plan.

May also have a separate development agreement for site plans and condominium developments

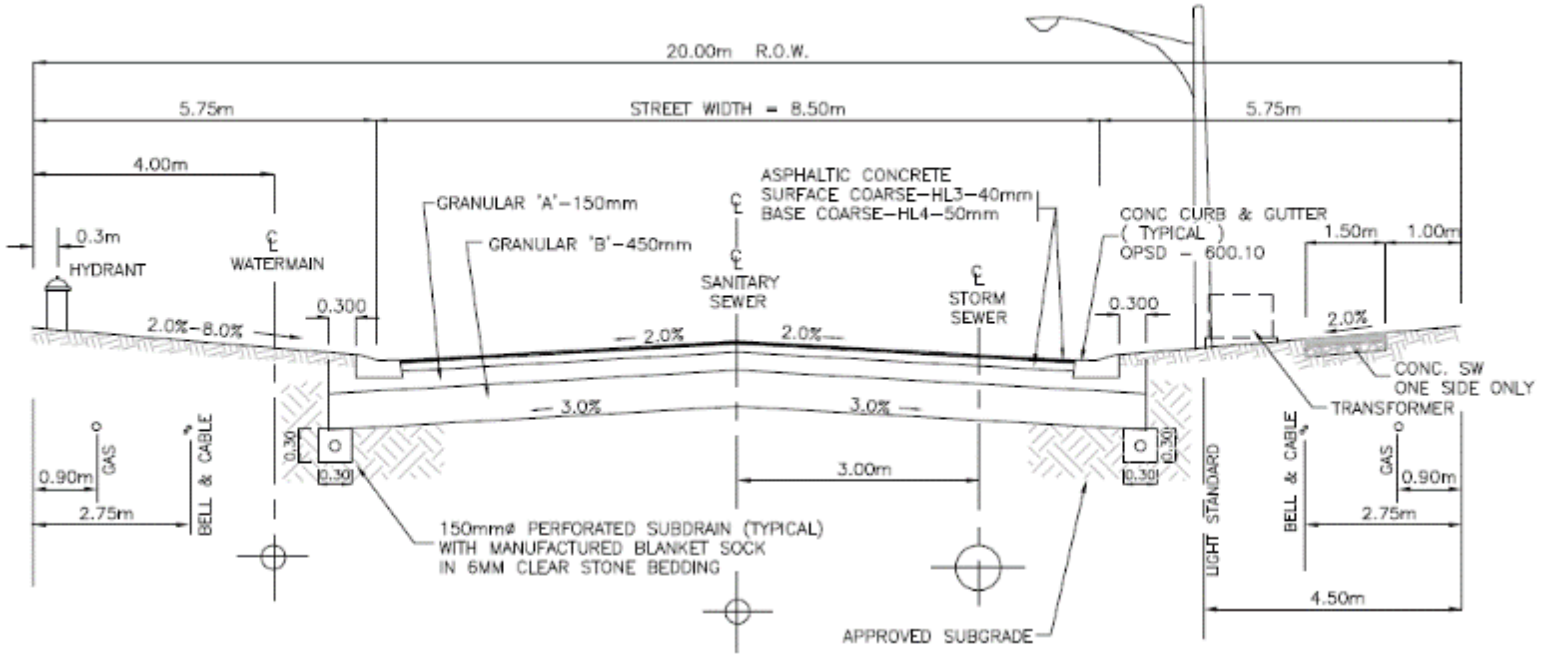
Condominium:

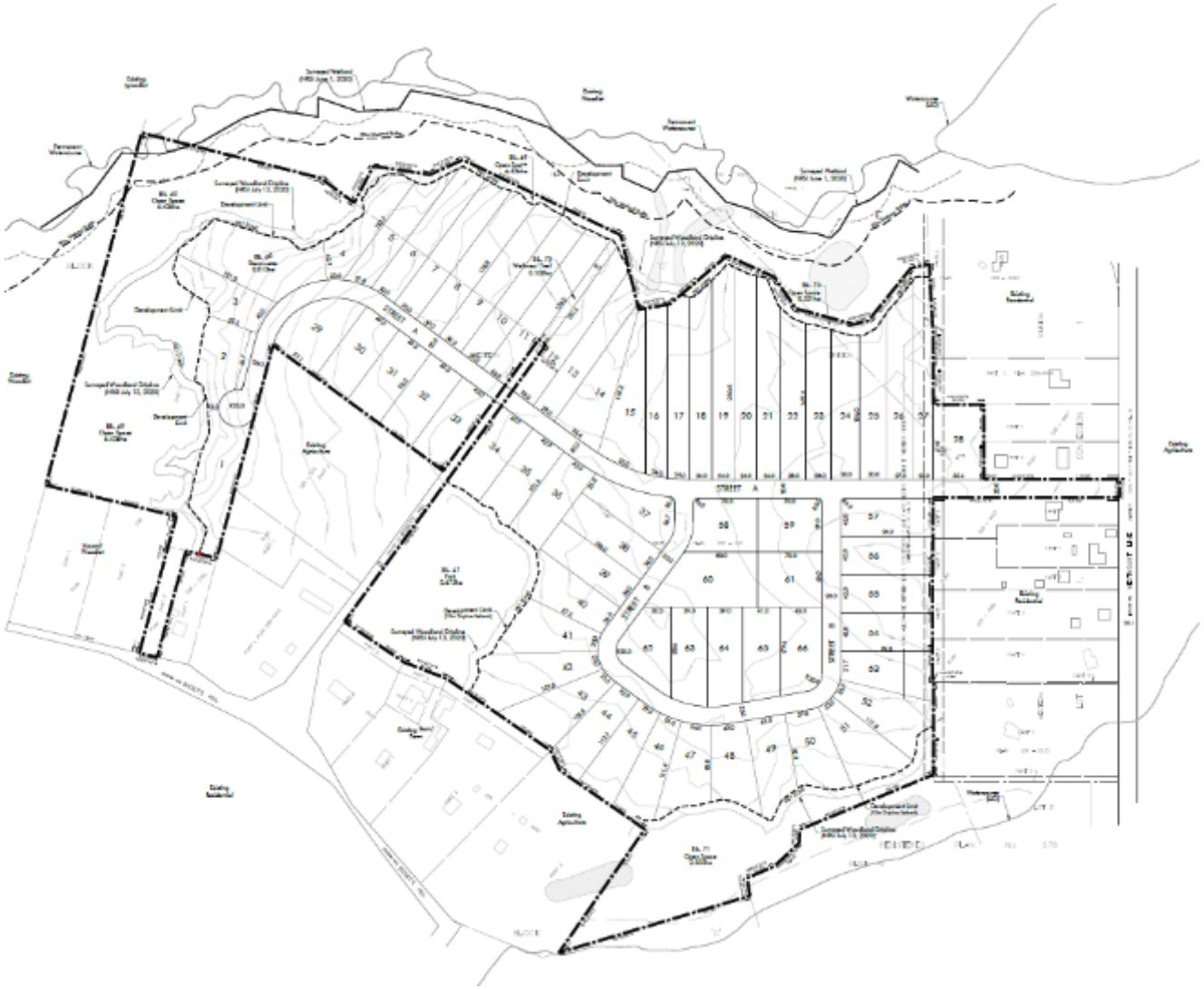
- Residents are owners of units, possibly lands and members of corporation that owner common elements.



Subdivision Agreement:

- An Agreement between the developer/Owner and the municipality
- To construct public works on new roads

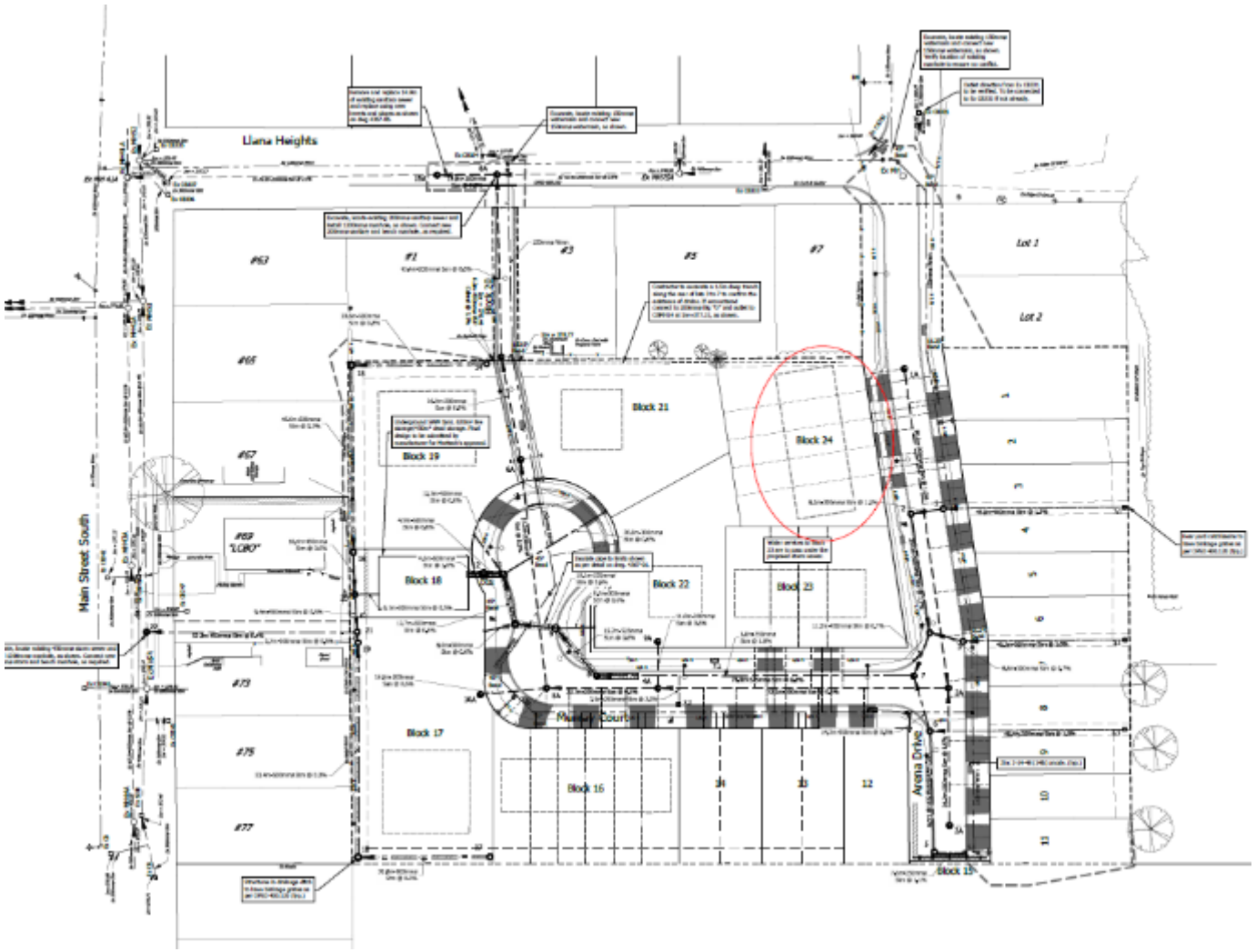




Subdivision

Public Roads/Subdivisions

- The creation of lots, or blocks on public roads. Requires the construction of public roads and services.



Subdivision Agreement Includes Provisions:

- Liability Insurance
- Securities (100% of value of public works)
- Lot grading requirements
- Lists of services to be installed and standards
- Requirements of other approval agencies

Sub. Agr. Includes Provisions:

- For Stages of servicing required for Preliminary Acceptance prior to building permits or occupancy.
- Warranty period for services prior to Final Acceptance.

  Final Acceptance ≠ Assumption

- At some time after Final Acceptance, an Assumption bylaw is passed.

Sub. Agr. may include:

- Cost sharing
- Example: 10 lots for developer, existing dev. to the municipality, other side to future developer

Sub. Agr. may include:

- Oversizing – where the municipality asks a developer to enlarge a utility, say a sanitary sewer through the development to facilitate future capacity beyond.
- Policy to pay after the first incremental pipe size larger than needed for the initial developer.

Questions?

Bridges and Culverts Design & Approvals

COUNCIL TRAINING SESSION

Agenda

- Introduction
- Ontario Regulation
- Canadian Highway Bridge Design Code
- Bridges in HK
- Bridge and Culvert – Design, Approvals and Construction Stages

Ontario Regulation 104/97

- The structural integrity, safety and condition of every bridge shall be determined through the performance of at least one inspection in every second calendar year under the direction of a professional engineer and in accordance with the *Ontario Structure Inspection Manual (OSIM)*, published by the Ministry, as it may be amended from time to time.
- OSIM inspections guide capital works, priorities related to bridges and culverts.
- Next OSIM inspections will be 2024.

Canadian Highway Bridge Design Code (CHBDC)

Applicable for all structure that provides a roadway or walkway for the passage of vehicles, pedestrians, or cyclists across an obstruction, gap, or facility and is greater than 3 m (10’) in span.

New Bridges are to be designed to provide a minimum service life of 75 years.

Bridges in HK

99 Bridges in total. 45 bridges and 54 culverts

We estimate that 9 structures are over 80 years old, 81 structures between 25-80 years old, 9 less than 25 years old. Average structure age is 49 years.

With the last inspection, 2 structures were scored with a Bridge Condition Score below 40 out of 100 which generally suggested that they are in need or repairs or replacement. Average BCI is 71 (Good)

Bridge and Culvert Design and Approvals

Design Stage

- EA Requirements
- Site survey and site review
- Preliminary design
- Approvals
- Final design
- Tender

Construction stage

- Contract Administration

Design Stage

- Site survey and gather site information
  - Site survey to create a base plan used for design purposes and to show existing and proposed work.
  - Sometime need legal survey to confirm ROW limits, utility locate information or stream drainage area mapping from GIS data, geotechnical survey
- Establish EA requirements
- Preliminary design
  - Determine scope of work and evaluate rehabilitation/replacement options
  - Sometime need to do hydrology to determine structure size requirements and obtain approvals
  - Preliminary budget and timeline of work
  - May require archaeological/cultural heritage evaluations, aquatic species studies (depending on site, structure, scope of work)

Design Stage

- Approvals
  - Environmental permits and applications (Fisheries and Oceans Canada (DFO) / MNRF, Conservation Authorities,..)
- Final Design
  - Finalize preferred preliminary design and provide updated construction budget
- Tender
  - Prepare tender documents and aid in tendering process

Construction Stage

- Contract Administration
  - Co-ordinate construction start up and progress meetings
  - Review and approve shop drawings
  - Track work progress, tally quantities and prepare progress payments certificates
  - Perform site construction inspection to determine compliance with design, tender documents and approval agency requirements
    - Fish/mussel recovery

Questions?