

# Civil Engineering

## Introduction

Civil Engineering involves various assessments and studies to ensure that the development aligns with regulatory standards and community needs for water, sanitary, stormwater management, access and other utilities.

## What does a Civil Engineer do?

Civil engineering involves the servicing and access systems for any piece of land. This work can include assessment of existing roads and infrastructure, as well as the planning, design, and oversight of the implementation of a broad range of new infrastructure.

The main systems that civil engineering addresses include:

- Water supply systems – potable and fire suppression.
- Sanitary systems
- Stormwater management systems
- Roads and access
- Coordination of energy, telecom and natural gas utility systems.

Engineers also often are centrally involved in surveying and subdivision initiatives, as well as in approvals processes more generally.

## Why is it requested?

Civil engineering studies are requested to:

- Assess the state of existing infrastructure and access systems.
- Create concept plans for infrastructure and access systems.
- Create detailed designs (for construction) for infrastructure and access systems.
- Ensure that infrastructure meets safety, functionality, capacity, and regulatory standards – provincial and federal, as well as other inter/national engineering standards that may impact insurance or compliance.
- Ensure environmental and health and safety issues are adequately addressed.
- Integrate the development with existing municipal services and longer-term infrastructure and transportation plans.

## Scope of Work

### Survey Liaison

- Coordinate with British Columbia Land Surveyor (BCLS) for a topographical survey that includes necessary information to support accurate infrastructure, access design and site layout.
- Identify areas that need additional survey detail (environmentally sensitive and critical infrastructure), as well as to calibrate Lidar survey data.

## **Water Supply**

- Determine water demand (domestic and fire-suppression) for the projected development.
- Assess the current water supply capacity in the surrounding infrastructure including its capacity to handle projected fire-flow needs
- Review local government plans and policies for water supply infrastructure.
- Liaise with the government staff as needed.
- Recommend parameters for water supply infrastructure including on and offsite  
For unserviced lands, liaise with Hydrogeologists / well-drilling teams to confirm the appropriate supply amount and infrastructure, including storage, treatment, pumping and conveyance, as well as distances between wellheads and surrounding uses, including possible septic fields.
- Develop content for the Servicing Report on water supply.
- Provide high level cost estimate of required works.

## **Sanitary Systems Assessment**

- Assess the current sanitary system capacity in the surrounding infrastructure, and its capacity to handle projected additional flows.
- Review local government plans and policies for sanitary infrastructure.
- Liaise with the government staff as needed.
- Recommend parameters for sanitary infrastructure including on and offsite elements.
- For unserviced lands, work with any additional sanitary, geotechnical or other professionals to confirm the feasibility and design parameters for a septic system that will meet health, safety and environmental standards.
- Draft content for the Servicing Report on sanitary management.
- Provide high level (Class D) cost estimate of required works.

## **Stormwater Management**

- Review the project site plan and develop a model of stormwater flows.
- Review local government plans and policies for stormwater management and identify any additional provincial or federal policies that may apply.
- Liaise with the government staff as needed.
- Complete a conceptual stormwater management plan and recommend design parameters for building and landscape design.
- Complete a conceptual grading plan to support the stormwater plan.
- Provide high level cost estimate of required works.

## **Access and Road Design**

- Review applicable road design standards including street cross section, grade requirements, geometry, sidewalks, bike lanes, bus stops, boulevards and other applicable standards.
- Consider on and off-site requirements.

- Liaise with the government staff as needed.
- Work with the project team to develop a street design for the site.
- Provide high level cost estimate of required works.
- Draft content for an Access Report.

### **Hydro Service Assessment**

- Work with the project team to identify locations for Hydro service, including lines, the location of the electrical room, pad-mounted transformer (PMT) locations, accommodating policies related to electric vehicles and infrastructure demand, with input from an Electrical Engineer as needed.

### **Erosion and Sediment Control Plan**

- Assess the site conditions and the implications of the proposed plan.
- Confirm applicable policies and regulations.
- Liaise with government staff as needed.
- Determine the erosion and sedimentation risks.
- Develop design and operational guidelines for the project.
- Draft Erosion and Sediment Control Report.

### **What is generally required at each stage in the development process?**

Due diligence / securing land	<ul style="list-style-type: none"> <li>• Preliminary desktop assessments of the contextual services and applicable standards for infrastructure and access.</li> <li>• Basic concept plans and high-level cost estimates to determine the scale of costs a project may have to address.</li> <li>• Risk assessment of a range of factors related to water, sanitary, storm and access.</li> <li>• Highway/public road access issues assessment.</li> <li>• Scoping of engineering work and costs for the project.</li> </ul>
Concept Development	<ul style="list-style-type: none"> <li>• Conceptual servicing plan and access layout – associated with concept layouts for a site.</li> <li>• Additional cost estimates.</li> <li>• Research into applicable local government standards and plans associated with infrastructure and transportation.</li> <li>• Engagement with the local government to gain clarity on expectations.</li> </ul>
Preliminary Inquiry	<ul style="list-style-type: none"> <li>• Review the initial concept with local government staff to get initial feedback.</li> <li>• Confirm studies required and any applicable modelling assumptions and the scope of each study.</li> </ul>
Pre-Application	<ul style="list-style-type: none"> <li>• A Servicing Report including:</li> </ul>

	<ul style="list-style-type: none"> <li>o Servicing context information and applicable policies/regulations, likely on-/off-site infrastructure expectations and requirements.</li> <li>o Basic servicing concept and layout, including conceptual drawing for services, access, frontage works, water supply, sanitary and stormwater management. <ul style="list-style-type: none"> <li>▪ Onsite</li> <li>▪ Offsite (eg: adjacent streets)</li> </ul> </li> <li>• A grading plan.</li> <li>• Engagement with the local government engineering staff as needed.</li> </ul>
Rezoning	<ul style="list-style-type: none"> <li>• The Servicing Report (updated as needed). <ul style="list-style-type: none"> <li>o Water supply</li> <li>o Sanitary</li> <li>o Stormwater management plan</li> </ul> </li> <li>• Access plan</li> <li>• Grading plan</li> </ul>
Development Permit	<ul style="list-style-type: none"> <li>• The same Servicing Report required for a rezoning – with any additional details may be required beyond a rezoning level of detail if it may impact design elements of the building and site associated with the DP.</li> <li>• Note: The DP level of work includes a significant amount of building and landscape design, and engineering work needs to be done to a level that ensures that the building and landscape drawings as shown can be built. This may impact locations, depths, and any number of factors related to engineering and access – unique to each project.</li> </ul>
Subdivision	<ul style="list-style-type: none"> <li>• The Servicing Report (updated as needed). <ul style="list-style-type: none"> <li>o Water supply</li> <li>o Sanitary</li> <li>o Stormwater management plan</li> </ul> </li> <li>• Grading plan</li> <li>• Detailed engineering plans, to construction level of detail – leading to PLR/A and a Works and Services Agreement.</li> <li>• Sediment and Erosion Control Plan</li> </ul>
Building Permit	<ul style="list-style-type: none"> <li>• Detailed, construction-level engineering designs for construction of civil engineering infrastructure and access (including as part of works and services commitments).</li> <li>• Sediment and Erosion Control Plan (if required).</li> </ul>

Construction	<ul style="list-style-type: none"> <li>• Construction review (and contract administration if required) of civil engineering work for land and buildings to ensure they are built in accordance with the design drawings and applicable regulations, as per the Building Permit design.</li> <li>• Engagement with the construction review and approvals process with the local government, provincial Ministries, Health Authority and others.</li> </ul>
Post-Construction	<ul style="list-style-type: none"> <li>• Review of all servicing installations for land servicing to confirm completion according to Works and Services Agreement – and enabling registration of lots with Land Titles, and issuance of Occupancy Permit(s)</li> <li>• Completion of as-built drawings</li> </ul>