

# Building Our City

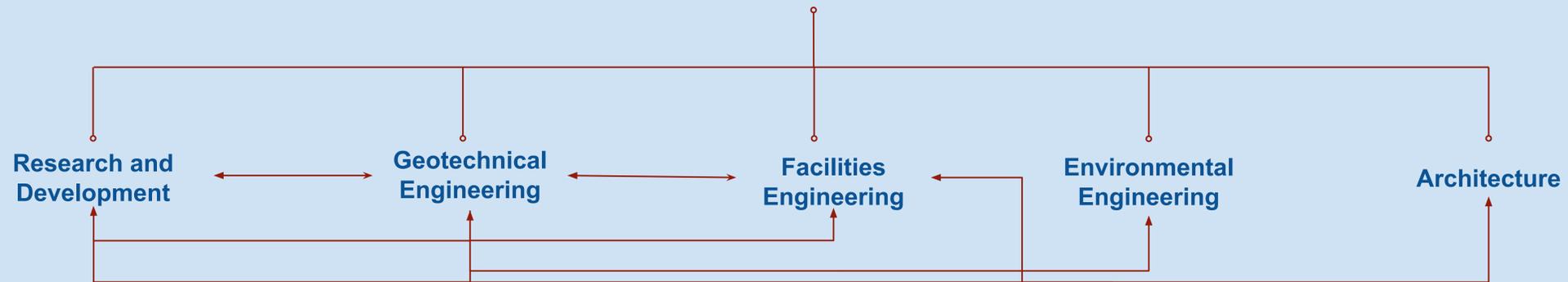
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## Integrated Infrastructure and Engineering Services



### What does each department do?

#### Research and Development

- The COE (City of Edmonton) runs four quality assurance materials laboratories: an Asphalt Lab, Binder (oil) Lab, Density (soil compaction) Lab, and Concrete Lab [see Figure 1.0]
- Each lab ensures that the contractors hired to complete city projects are fulfilling the promised quality of materials
- Specialized technologists will go out on site to collect samples of materials and then complete the necessary tests either on site or back in the lab
- Each test has strict specifications that must be followed by the technologist to ensure that results are uniform; when dealing with large city projects, millions of dollars of materials are being used and any confirmations or accusations must be made with absolute certainty

#### Geotechnical Engineering

- A main duty of the department is landslide monitoring and repair [See Figure 2.0]. The geotech. technologists place and monitor SI's (slope inclinometers) throughout the city in areas that are at a high risk of slope failure (eg. outside bends of the riverbank). The measurements that they receive from the SI's allow them to know when it is time to take action and attempt a bank or slope repair.
- The geotechnical engineering department also oversees and reviews the geotechnical reports that the consulting firms compose
  - These reports present the composition of soil in different locations on the lot subject to construction via borehole drilling and testing as well as suggestions how to proceed based on stability and quality of soil



Figure 1.0 A technologist preparing for on-site concrete testing



Figure 2.0 A landslide repair at Hollands Point on 23rd Ave

#### Facilities Engineering

- Facility engineering encompasses mechanical, electrical, and structural engineering
- The engineers get involved at the project's early planning stages and continue their involvement once construction is complete through the maintenance of the infrastructure
- The COE engineers in this sector are mostly responsible project overseers that specify the 'wants and needs' of the electrical/mechanical/structural components of the project. They provide design suggestions and instructions and act as the director for the hired mechanical/structural/electrical engineering consultants.
  - If the project is small, the City engineers may do the design themselves

### What does each department do?

#### Environmental Engineering

- The environmental compliance group (a team within environmental engineering) often investigates vibration complaints
  - Community members may complain that heavy vibration from construction or traffic is causing structural damage to their house or that the noise level is excessive and is harming their quality of life
  - Environmental technologists will set up 48-hour monitoring tests to investigate these claims to assess whether the City is responsible for disruption and damage
- They also collect snowmelt samples from the storm sewage drainage system and from outfalls of creeks and the North Saskatchewan river
  - They then compare the water's contents to the City bylaw and Surface Water Quality Guideline specs to determine the quality



Figure 3.0 A snowmelt collection and testing site in Edmonton. Samples are collected weekly, as snow melt testing is a long-term monitoring process.

#### Architecture

- City architects are similar to the COE engineers in that they hire and oversee consultants to construct the plans for the projects; they review all proposals and have responsibility in directing the consultants
- They work with other groups within the City to facilitate public communication to ensure that the new infrastructure's preliminary concepts, final design, and finished product are all in line with the citizens' vision while taking the technical details into consideration

### How do they all fit together?

#### Integrated Infrastructure Services: Building Our City

- Building, improving, and maintaining all City owned infrastructure is a huge job that cannot be tackled by a single group. The IIS (Integrated Infrastructure Services) department employs project managers to coordinate the many smaller units within the department that work together on City projects.
  - The process usually begins with city planners, who compose the ideas for new infrastructure
  - Project architects are brought into projects almost immediately (even before land purchase) and stick with them throughout the entire process and into the much later rehabilitation stage
    - As more professionals (engineers/consultants/contractors) are brought into the project, the architects communicate with them and adapt the designs as the project evolves
  - Before any technical planning can begin, a geotechnical evaluation [see previous description] must be done because the soil quality will directly affect building placement and structural design elements, like the foundation
  - After the geotech report, engineering consultants are brought in to work on the design plans under the guidance of City facility engineers
    - The facility engineers (along with the architects) will also monitor the construction throughout to ensure that everything is running according to the plans
  - Once the construction is underway, the materials technologists will come to site to complete quality assurance testing
  - The environmental compliance group is also active during construction to ensure that no other nearby infrastructure is damaged in the process, monitoring this through noise/vibration testing
    - In addition to their involvement in new projects, they monitor existing City drainage infrastructure



Figure 4.0 A computer generated graphic of the new Red Panda exhibit at the Edmonton Valley Zoo

- All of these groups share maintenance responsibility for completed projects and work together to keep City infrastructure working and efficient

### The connections between Materials Testing and Geotechnical Engineering

#### Geotechnical Engineering and Materials Testing Joining Forces

- All geotechnical work requires testing in the field to ensure that the materials being used are adequate, and all infrastructure construction, which depends on materials, requires a geotechnical evaluation to determine land conditions before planning can begin. In this way, the two departments work together.
  - For example, a landslide repair project will usually involve excavation and then backfill with a granular material
    - Before this material can be placed, technologists from the Soil Density Lab (a materials lab) must use a nuclear densometer to confirm that there is 98% SPD (Standard Proctor Density) compaction
  - Another example of this partnership is roadwork. A geotechnical subgrade evaluation must be done to determine the strength and quality of the soil underneath where the road will be constructed. This information is then used to make a paving plan. Once construction begins, material QA tests will be frequent and important.

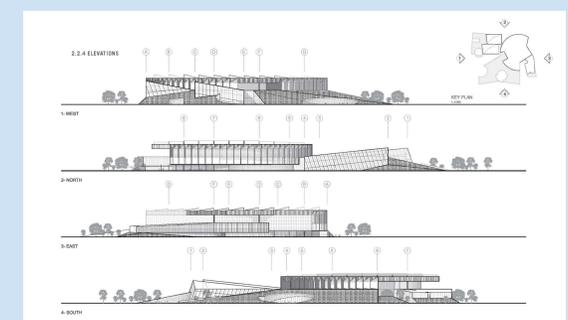


Figure 5.0 A schematic design report of the new Lewis Farms Recreation Centre