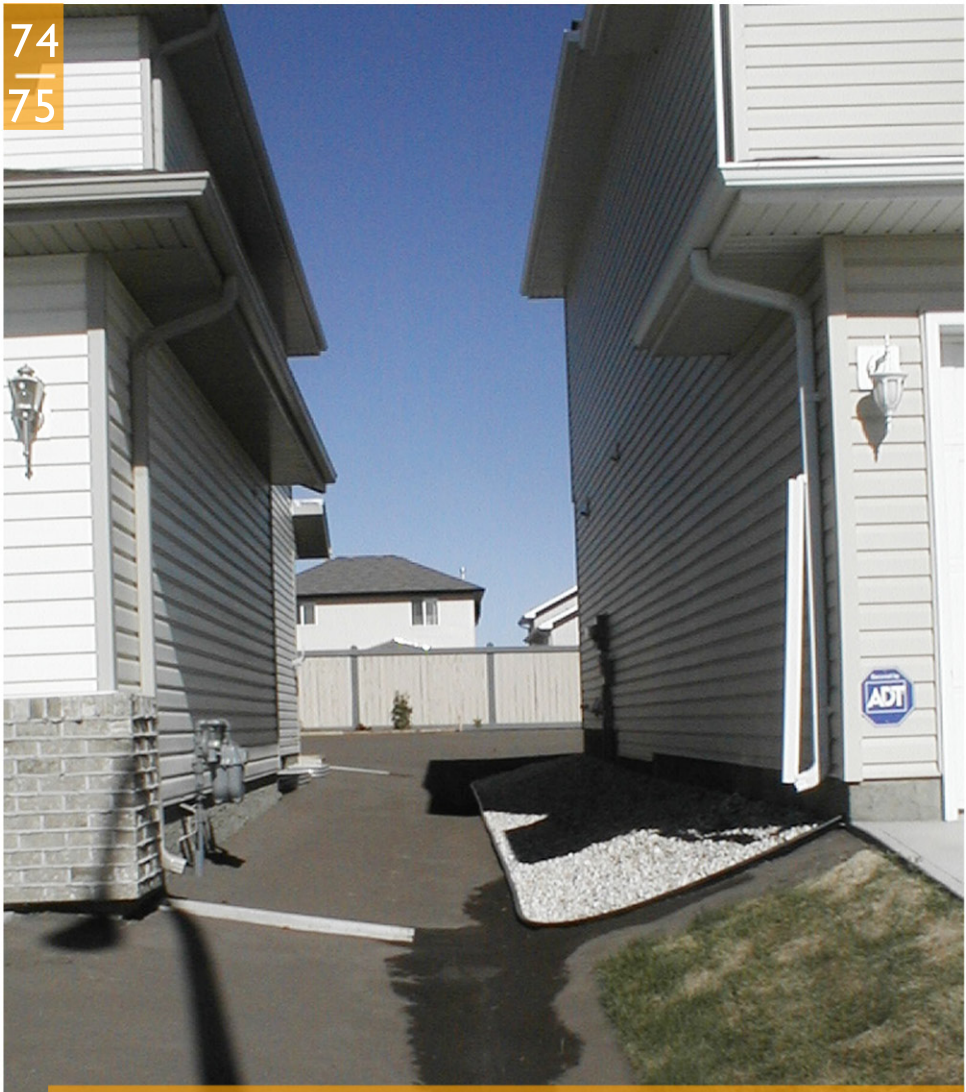

EDMONTON

Lot grading drainage by-law

Source: City of Edmonton

THE SCIENCE

Lot grading is a powerful mechanism for managing the risk of damage to buildings from extreme rainfall. Where possible, water should be directed safely away from buildings through appropriate grading to reduce the risk of damage from inflow and flooding associated with overland flows and seepage. Moreover, if water is permitted to accumulate near buildings, it can overwhelm drainage systems and sewers, increasing the risk of sewer backup damage to the building and neighbourhood, and water damage from flooded basements, especially when foundation drainage is connected to sewer systems.

Land that slopes toward buildings increases risk of flood damage, while the risk is reduced if the land slopes away. Water should be directed toward permeable surfaces, like grass covered swales, lawns, rain gardens, and appropriate stormwater management infrastructure. The lot grading must not increase flood risk for neighbouring properties.

Moreover, appropriate lot grading created during the construction of a new residential development needs to be maintained to remain effective. Over time, land will settle and may reduce the protection initially in place. Also property owners may inadvertently alter the lot grading protection for their homes through landscaping and gardening projects. Responsibility for ensuring the effectiveness of lot grading shifts over time from homebuilders and landscape specialists during initial construction to the property owner.

THE TRIGGER

Edmonton is widely recognized for its leadership in the identification and implementation of local actions to reduce the risk of damage to homes from basement flooding. Many elements of Edmonton's comprehensive flood reduction strategy have been in place for more than three decades, like a requirement that all new homes install a backwater valve (1989).

The City of Edmonton has also been a pioneer in testing actions to address lot grading. This evolved from a strong relationship with local developers and home builders seeking direction from the City about how to best address the risk of basement flooding. In the mid-1980s, surveyors, developers and builders approached the City to create an enforcement process for all developers, builders and owners for an approved surface drainage plan design. In 1988, the Municipal Planning Commission requested that a strategy be developed to enforce lot grading design plans for new developments.

THE APPROACH

The Drainage By-law was developed and implemented by the City of Edmonton to reduce flood risk in new buildings through appropriate lot grading. The by-law requires that the City Manager approve surface elevations and grades of residential lots in two stages: the rough grade and the final grade. The rough grade stage is typically the responsibility of the homebuilder. During this phase, the lot is graded approximately seven to 20 cm below

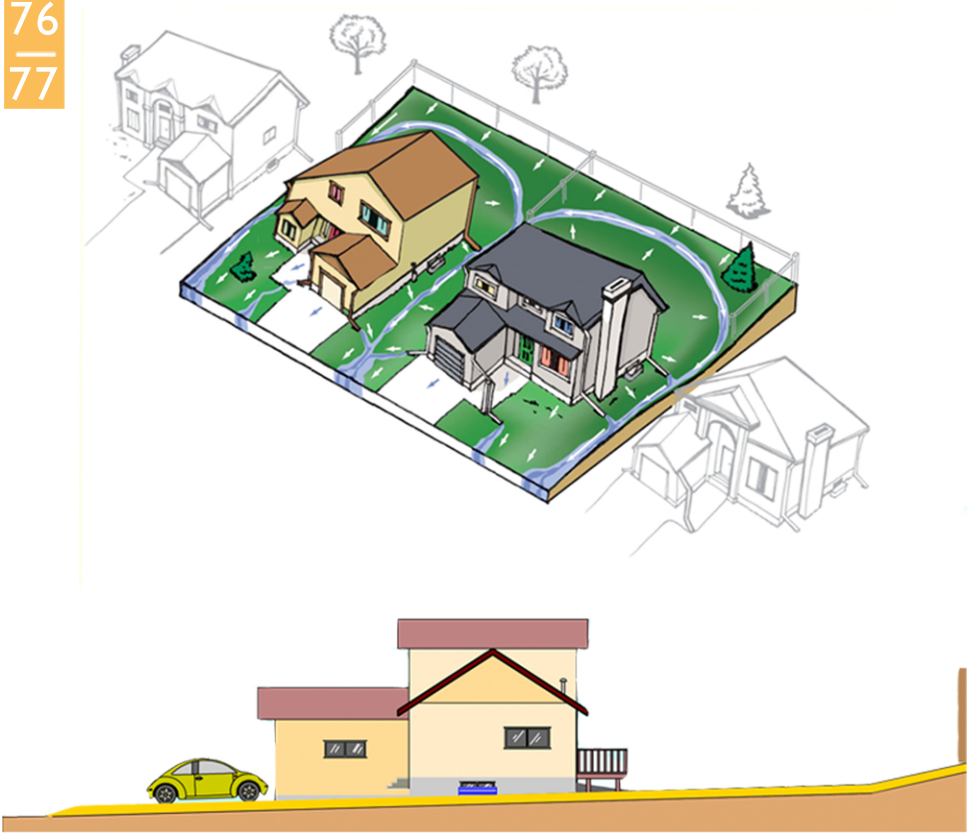

Figure 21 : *The illustrations above were used by the City of Edmonton to show proper lot-grading.*
(Source: City of Edmonton)

the proposed final grade elevations in order to generate a drainage template before the final grading and landscaping.

Once that step is completed, seven to 20 cm of topsoil is placed on the lot to create the final surface drainage pattern. An inspection has to be completed by a lot grading inspector following the completion of each phase to determine if the surface elevations are within acceptable tolerance of the design elevations on the approved Lot Grading Plan. During the inspection, inspectors make sure that driveways and sidewalks are completed, that the site is clean and free of debris and construction materials, that the grading is uniform and free of ruts, depressions or excess soils, and that the lot slopes away from foundation walls.

Every sloped surface on a lot has to effectively drain water away from foundation

foundation walls, including areas under steps and decks. To meet this requirement, a 10 percent slope has to be generated for the first 2.0 m around the building with a minimum of 20 cm drop for final landscaping. The slope standard for concrete, asphalt and other impervious surfaces is 0.75 percent. The slope standard for grass drainage swales is 1.5 percent and paved swales have to meet a minimum slope requirement of 0.75 percent. Swales are lower tracts of land designed to collect and convey surface runoff away from the building. The standards apply to new home construction and major renovations.

THE OUTCOME

The establishment of the lot grading by-law in Edmonton has evolved over three decades. Following requests by surveyors, developers and builders, the City of Edmonton implemented drainage and lot-grading standards under the Minimum Property Standards By-law in 1989. Edmonton's Building by-law was amended in 1993 to accommodate lot grading approval fees and from this point residents who applied for a building permit were asked to cover the charges of lot grading approval. In 1997, the Surface Drainage By-law came into effect, consolidating parts of the Minimum Property Standards and Edmonton Building by-laws. The Surface Drainage By-law was consolidated into the Drainage Bylaw on June 1, 2013.

Even though the drainage by-law only came into effect as it is today in the late 1990s, the lot grading standards stated in the by-law are enforced retroactively for all properties developed after 1989.

Edmonton has been recognized for its leadership in addressing a number of stormwater management issues, including lot grading. Since the adoption of the Drainage By-law, several municipalities across Alberta have approached the City of Edmonton to mirror their lot grading requirements.

A WORD FROM EDMONTON

When asked for his thoughts on the Drainage by-law, Filipe Gonçalves, Lot Grading Inspector for the City of Edmonton, suggested that it was a great method to establish a standard for the industry and owners in order to avoid drainage issues for properties. Mr. Gonçalves stated that "…during the implementation process, we faced some resistance from property owners back in 1993 when the final grade inspection became mandatory. At the time, some property owners felt like a surprise additional cost was added when renovating or buying a new property. Now, the owners expect that cost as part of the purchase of a new property since the process has been in place for more than 20 years."