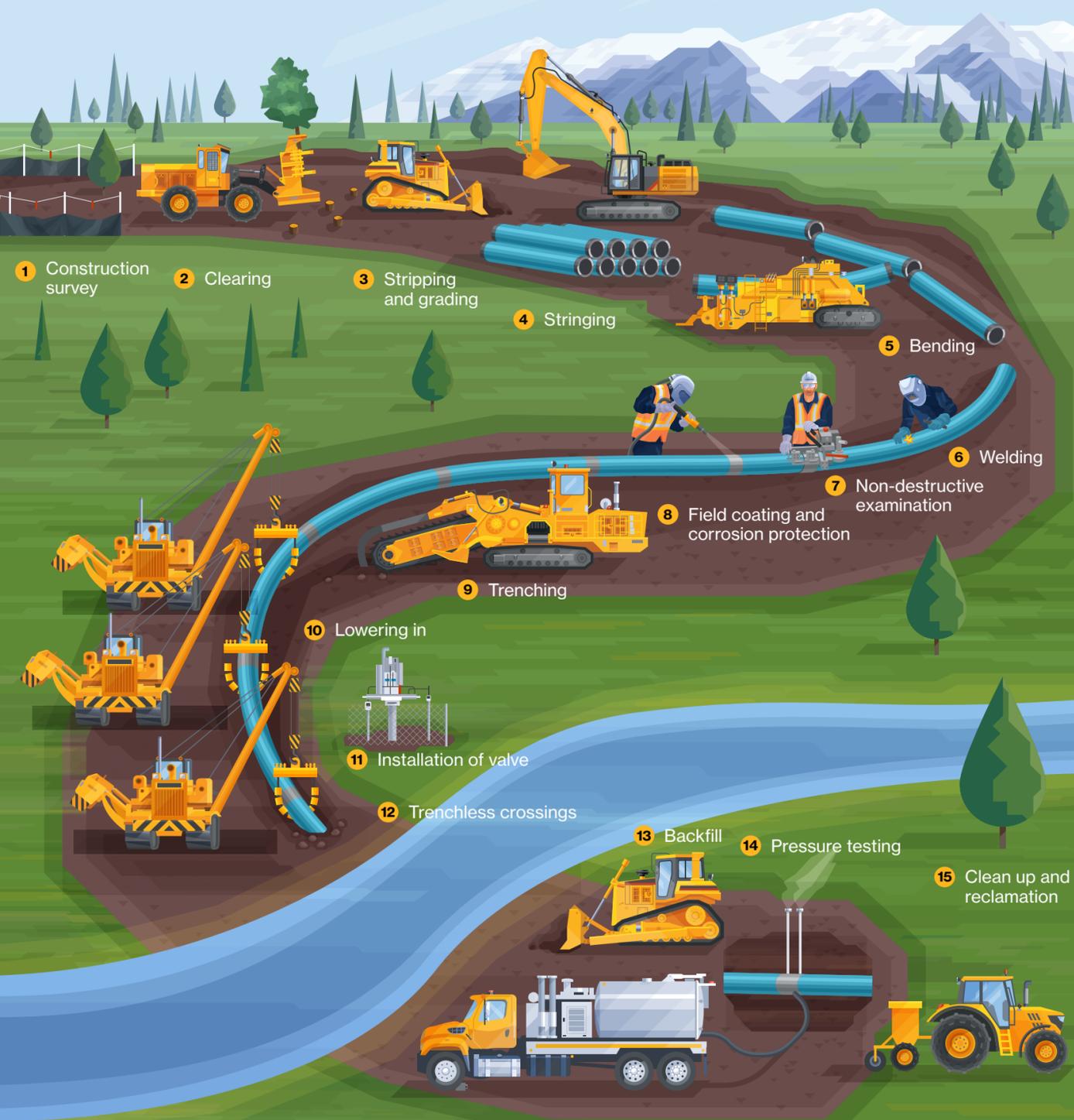


# Pipeline construction: Safety and the environment

Safety and reliability are built into Enbridge's energy infrastructure before, during, and after the construction phase. We take care to limit our footprint, and actively manage potential effects on communities and the environment, as we build our pipeline projects.



- 1 Construction survey:** Surveying is an integral part of pipeline construction; it refers to the installation of visual reference points/markers that define the ROW limits and guide the construction of the pipeline while including necessary appurtenances according to the design drawings.
- 2 Clearing:** To prepare for construction, crews mulch and/or clear and salvage trees, where warranted, along the ROW and temporary workspace.
- 3 Stripping and grading:** After clearing is complete the topsoil is removed and preserved, an activity known as stripping. Grading is where equipment is used to level out land contours to allow for safe travel and construction along the ROW.
- 4 Stringing:** Stringing the pipeline involves laying out the pipe above ground along the ROW in the order it is to be welded and installed.
- 5 Bending:** Crews bend the sections of pipe to match engineering specifications and follow the contour of the ROW lands.
- 6 Welding:** Welding is performed to join lengths of pipe together as the construction crew moves along the pipeline ROW. Welding is a process that uses fusion to join two or more materials together to create a single manufactured or fabricated item.
- 7 Non-destructive examination:** After pipes are welded together, every weld is inspected visually and also with by using Non-Destructive Examination (NDE). NDE uses methods such as x-ray or ultrasonic technology to examine the weld for flaws or defects that cannot be seen with the naked eye.
- 8 Field coating and corrosion protection:** Coating of the pipeline provides a protective barrier against damage to the pipe.

- 9 Trenching:** Trenching typically involves excavation of a trench in the ROW for pipe installation.
- 10 Lowering in:** During lowering in, sections of the pipeline are carefully lifted off of skids and lowered in using a series of side booms moving in sequence with non-metallic slings and rollers to protect the pipeline coating.
- 11 Installation of valve:** Valves connect the new pipeline into an existing facility and are typically installed at the beginning and end of the pipeline. Valves may also be required at intermittent points along the pipeline route for isolation and integrity management purposes.
- 12 Trenchless crossings:** Common trenchless crossing methods include tunneling, auger bores, and horizontal directional drilling. Trenchless pipeline installation is done to minimize the impact to ground surface conditions and crossing installation can be scheduled at various stages during construction.
- 13 Backfill:** Once the pipeline is lowered in, crews carefully place the subsoil and excavated material that is free of foreign debris and large rocks, overtop of the pipeline until it is no longer visible.
- 14 Pressure testing:** Each section of the pipe is filled with water and subjected to extreme operating pressures to ensure the strength of the pipe and the works.
- 15 Clean up and reclamation:** This final step is to reclaim the land as close as possible to its original condition.



## Staying safe on the roads

During construction, residents can expect to see an increase in Enbridge traffic – heavy-haul vehicles, buses and crew trucks – on highways, secondary highways and rural township roads. To manage traffic volume and ensure public and worker safety, we make sure to:

- Develop a traffic accommodation plan to minimize impacts to community residents
- Move heavy equipment across roads during off-peak hours
- Bus crews to and from the construction site where possible
- Actively communicate with the local community on any disruptions to normal traffic patterns
- Pay strict adherence to mandated noise limits
- Install and maintain proper signage at work sites, road and temporary access crossings
- Build protective structures to prevent damage to road surfaces and facilitate equipment and truck crossings



## Limiting our footprint

As we plan and build our pipeline projects, we make every effort to limit our construction footprint. This includes:

- Using pre-existing rights-of-way, such as utility corridors, where possible
- Using horizontal directional drilling (HDD) technology, which involves drilling an underground arched tunnel, whenever possible to install underground pipelines across large rivers or sensitive crossings
- Working closely, and continuously, with regulatory agencies, and complying at all times with all environmental requirements
- Using existing access routes to and from construction sites, minimizing temporary workspace, and limiting ground disturbance



## Habitat restoration

Following construction, we minimize our long-term impact to the land along our pipelines. Our habitat restoration methods include:

- Reclamation, including soil replacement, seeding and tree planting
- Environmental monitoring and mitigation
- Follow-up landowner outreach