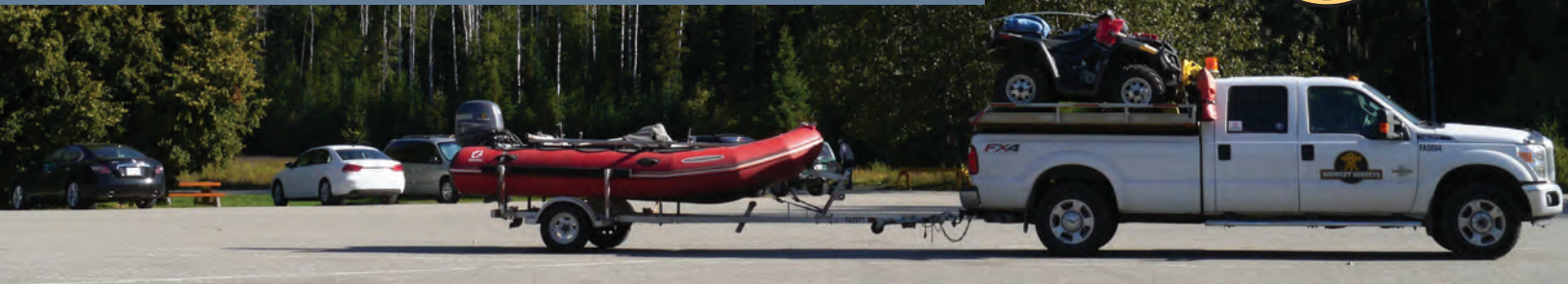


# PIPELINE INTEGRITY SERVICES



Midwest Surveys has over **65 years of experience** providing Geomatics services to the oil and gas industry. Our **dedicated project managers and office staff** guarantee quality deliverables formatted to meet your individual project needs.

Minimize project costs by providing your team with detailed and accurate survey plans to help develop efficient working relationships with landowners.

Midwest's comprehensive service offerings provide pipeline and topographic information to assist with land negotiations. Accurate survey plans and access maps ensure your field representatives get to their site in a safe and professional manner.

Midwest's Integrity Group surveys hundreds of dig sites each year. With more than 75 professional and proficient field crews throughout British Columbia, Alberta, Saskatchewan, and Manitoba, Midwest has the resources to provide accurate and timely service for successful completion of your integrity projects.



## OUR SERVICES

- In-line inspection (ILI) dig site surveys
- Data correlation of in-line tool with as-built field survey data
- River/creek crossing surveys
- Pipeline profile and depth-of-cover surveys
- Above ground marker (AGM) surveys
- Access maps
- Facility as-builts and construction layouts
- Hydrostatic testing surveys
- Pipe as-builts for repair/replacements
- Pipeline class upgrade surveys
- Emergency repair assistance
- Slope stability and deformation surveys
- Cathodic protection surveys for new and existing ground beds
- Class location field verification surveys
- Pipeline current mapping
- Historical data management



## In-Line Inspection (ILI) Dig Site Surveys

- “Safe Work Area Surveys” to identify all above ground and buried facilities prior to ground disturbance/excavation.
- Our field trucks are fully equipped with two types of locators that have been tested and tried for reliability and precision. Additionally, our crews receive training in line locating and are supplied with checklists and procedures to ensure the upmost attention and care is taken while completing the job. Our field crews perform “five way sweeps” to identify all buried facilities that could affect job safety and project timelines. As an added service, our crews correlate all existing facilities for future project needs. Finally, a full field sketch including a detailed “Safe Work Area” is provided.

## Data Correlation of In-Line Tool with As-Built Field Survey Data

- Midwest will accurately proportion all your dig sites, providing a complete pipeline profile prior to digging, supplying ILI listing and girth weld mapping files. Midwest will ensure optimal project management, keeping your construction crews working safely and efficiently.

## Water Crossing Surveys

- Midwest Surveys has surveyed numerous large and small water crossings throughout Western Canada. Our fully equipped Zodiac boats have the latest sounding and positioning equipment. Our specialized field crews carry their Pleasure Craft Operator Card and are trained in Swift Water Rescue levels 1 & 2. We understand the permit and regulatory requirements, and subsequently provide you with depth-of-cover and a full bathymetric survey required for water crossings.
- Access to real time data of water levels and environmental constraints assists our crews in working safely and efficiently. We collect, record, and archive data for use in future water crossing projects. There is value in knowing the best launch and docking points, land owner information, and any other notable details that will help with future visits to water crossing locations.
- Due to increasing demand and seasonal nature of this specialized service, Midwest will be reserving crews for over 150 water crossings annually. Call today to reserve our team of experts.
- The accuracy of our pipeline depth-of-cover surveys in the water:
  - ODOM Echotrac CV-100 (transducer)
  - Depth Range <30cm to 600m
  - Accuracy (corrected for sound velocity)
  - 200 kHz – 0.01 m +/- 0.1% depth
  - 33 kHz – 0.10 m +/- 0.1% depth

## Pipeline Profile and Depth-of-Cover Surveys

- Midwest crews are outfitted with the most advanced radio detection locators, achieving accurate depth measurements. This technology provides subsequent depth accuracies within +/- 5%.
- Pertinent information is included, such as ground elevation, coverage, and a top-of-pipe profile. This information is supplied as a .dwg file and Excel® spreadsheet.

## Above Ground Marker (AGM) Surveys

- AGM established with centimetre accuracy to guarantee a better tool run. AGM referenced to surface features along with adjusted coordinates to allow the marker to be repositioned if destroyed.

## Access Maps

- These plans show owner and crossing information, location of all facilities, aerial photography, and any client-specific requirements. We have checks to ensure ownership and dispositions are correct. Our access maps will help your land group and your field representatives to acquire the necessary permits.

## Facility As-Builts and Construction Layouts

- Determination of the positions for your new build, pre- and post-construction.

## Hydrostatic Testing Surveys

- We provide a gamut of crucial data such as high-point, low-point, bend coordinates, critical-lows, grade profiles using LiDAR data, and much more.

## Pipe As-Builts for Repair/Replacements

- Receive the measurements and coordinates to assist in replacing and repairing existing pipe. Upon installation of new pipeline, Midwest will also provide an updated plan displaying the pipe data and final ties.

## Pipeline Class Upgrade Surveys

- Before upgrading your pipeline, Midwest will create an existing line profile and tie-in all present facilities, supplying the required plans to design your pipe replacement. All the required geomatics information will be supplied to provide a safe work area.

## Emergency Repair Assistance

- Midwest is on call 24/7 to support emergency repair. We have over 75 crews servicing British Columbia, Alberta, Saskatchewan, and Manitoba, increasing response time for pipeline repairs.

## Slope Stability and Deformation Survey

- Our team of professionals measure accurate 3D ground positions. We will work with your engineers to monitor and provide repeat measurements to properly observe pipeline stress.

## Cathodic Protection Surveys for New and Existing Ground Beds

- Facility locates and topographic surveys to prepare plans for your new and existing groundbeds.

## Class Location Field Verification Surveys

- With over ten offices throughout Western Canada, Midwest is close to all your pipeline upgrade projects. Our team supplies radius maps and tie-ins of all required facilities. We also include accurate and detailed information to display compressors, roads, and other infrastructure within the parameters of your project area.

## Pipeline Current Mapping

- Our pipeline current mapper accurately locates buried pipes and, when used with the a-frame, can pinpoint coating defects.

## Historical Data Management

- Data collected from integrity projects is archived and compiled to aid our crews and to save time and costs associated with future projects.



## SERVICE

## DELIVERABLES

### In-Line Inspection (ILI ) Surveys

- A field sketch showing all underground facilities
- Digital photos of the site
- A drafted plan can be provided to aid in acquiring land and crossing agreements

### Data Correlation of In-Line Tool with As-Built Field Survey Data

- Excel® file with pipeline profile showing the calculated locations of the girth welds and other features

### Pipeline Profile and Depth-of-Cover Surveys

- Excel® file and graphical profile of your pipeline (profile includes top of pipeline ground elevations)
- A plan view of the water body and associated topographic information

### Pipeline Depth-of-Cover Surveys

- Excel® file and graphical profile of your pipeline (profile includes top of pipeline ground elevations)
- A plan view of the pipeline and associated topographic information can be provided if desired

### Buried Facility/Line Locating

- A field sketch showing all underground facilities
- Digital photos of the site
- A drafted plan can be provided to aid in acquiring land and crossing agreements

### Above Ground Marker (AGM) Surveys

- Excel® file showing the locations of the AGM's, the elevations and the depth of the pipe
- A drafted plan is provided showing the AGM referenced to surface features along with adjusted coordinates to allow the marker to be repositioned if destroyed

### Access Maps

- Access Maps include:
- Aerial photography
  - Ownership of all access roads used
  - Length of all road segments
  - All dispositions and crossings

### Facility As-Builts and Construction Layouts

- Buried facility locate and safe work area plan
- Preliminary drawings
- Construction layout
- As-builts
- Redlining of engineering drawings

### Hydrostatic Testing Surveys

- Plans and an Excel® file showing the pipeline profile
- Test section plans showing highpoint, low points, critical lows, elevation and profiles
- Safe work area survey for excavation and placing of test heads
- As-built survey and final tie sketches

### Pipeline Class Upgrade Survey

- Buried facility locating and safe work area plans
- Preliminary drawings
- Construction layout
- As-builts and final tie sketches

### Emergency Repair Assistance

- Survey of the affected area and a “safe work area plan”

### Slope Stability and Deformation Survey

- Monitor and provide repeat measurements observing ground movement which could affect buried pipelines or above ground facilities
- Excel® file showing movement of markers

### Cathodic Protection Surveys Including New and Existing Ground Beds

- Buried facility locating and safe work area plans
- Preliminary drawings as well as legal plans for new right-of-ways
- Construction layout
- As-builts

### Class Location Field Verification Survey

- Radius maps
- Confirmation of facilities, occupation, land use, etc

### Pipeline Current Mapping

- Identify deficiencies/corrosions and other defects along your pipeline

### Historical Data Management

- Access to information on previous integrity projects and references for future projects

# WATER CROSSING SURVEYS



## OUR FLEET

- We house 14' Zodiac Futura inflatable boats with 40 horsepower jet drive engines and inflatable Zodiac Zoom boats (self-propelled).
- Utilizing Odom Hydrographic Echotrac CV100 single beam echo sounder systems.
- 4° and 9° Transducers for river bed resolution up to 0.01 metres.
- Each field crew is equipped with the latest GNSS RTK Receivers and highly accurate total stations.
- Custom designed and built mounting hardware to ensure a stable and accurate hydrographic survey.
- Custom engineered and built trailers to expedite boat launching and retrieving in challenging terrains and crossings.
- Rigging equipment to complete crossings that are unable to accommodate our 14' Zodiac Boats.
- Radio detection pipe locating equipment to offer depth-of-cover profiles for buried facilities.

## OUR CREW

- Our highly qualified personnel have combined experience in over 350 water crossing and depth-of-cover surveys. These locations vary in terrain from Vancouver, BC to Estevan, SK, and as far north as the Northwest Territories border.
- Each employee on our river crossing team has completed Swift Water Rescue Training 1 & 2 to ensure that the highest safety standards are maintained while completing the work.
- Each employee holds a valid Pleasure Craft Operator Card and has completed in-house training on all of our boats and hardware.
- Our field crews practical experience allows them to navigate each water body safely and efficiently.
- Each employee has completed standard First Aid & CPR, Off-highway Defensive Driving, and has completed ATV certification.

## OUR SCOPE

- Each location is scouted using numerous sources of air imagery to determine the best access and egress points for boat launch to efficiently survey the crossing.
- With each survey, a plan view drawing is provided showing the location of buried facilities, all found and placed survey control and the position of all topography collected. This includes a contour survey (if necessary) to accurately determine slopes, scours and possible failure points.
- Also included are the position of photos taken onsite, and the direction they are facing allowing you to determine the nature of the crossing without a field visit.
- Additionally, we can provide a pipe and ground profile both as a drawing and as an Excel® spreadsheet.



*Service Beyond Boundaries*