



*A member
of the
Canadian
Council of Land
Surveyors*

Position Paper On Buried Facilities

Revised September 25, 2007

Introduction

The Alberta Land Surveyors' Association is concerned that ground disturbance policies and the concern to prevent damage to buried facilities has affected the Alberta Land Surveyor's ability to safely put the iron posts in the ground that mark boundary lines. Without these statutory monuments in place, there may be complaints by landowners and even the buried facility owners themselves as to the correct location of their property or rights-of-way.

Definitions

As outlined in the Multi-Stakeholder Damage Prevention Task Force Position Paper, dated February 7th, 2003, and for the issues within this position paper, the Alberta Land Surveyors' Association has adopted the following fundamental definitions concerning buried facilities and ground disturbance:

That the term "buried facilities" can refer to:

Anything below ground for use in the collection, storage, transmission or distribution of:

- Water
- Sewage
- Storm water
- Electronic communications
- Telephonic communications
- Cable television
- Electrical energy
- Oil
- Petroleum products
- Natural gas
- Steam
- Chemicals
- Other substances

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And that “buried facilities” themselves include but are not limited to:

- Pipes
- Conduits
- Culverts
- Wires
- Cables
- Lines
- Fibre optics
- Duct banks
- Manholes
- Catch basins
- Valve chambers
- Attachments to the above

And that “ground disturbance,” although defined in the Pipeline Act and Regulation, has become the preferred term for excavation to include:

- Excavation
- Digging
- Trenching
- Plowing pipe or cable
- Drilling
- Vertical and horizontal auguring
- Tunneling or boring
- Ditch shaping
- Driving bars, posts, anchors
- Grading
- Topsoil stripping
- Land leveling
- Tree planting
- Blasting
- Vibrosis
- Pipe pushing
- Rock picking
- Subsoil aeration

The Alberta Land Surveyors’ Association

The Alberta Land Surveyors’ Association, (ALSA) and its members are well aware of the extensive buried infrastructure that exists within the province of Alberta. In a large part, we as land surveyors have played a key role in helping put it there.

Most sections and quarter sections were surveyed in 1882-1885, long before Alberta became a province in 1905. Since then, the land required for development was surveyed, laid out, and registered at Land Titles in the form of subdivision plans.

With the onset of the resource industry, first in the Turner Valley area, then in the rest of the province from the late 1940s, with the explosion of land development since the 1970s and even more so today as evidenced by the hundreds of thousands of subdivision, utility right-of-way and pipeline and power line right-of-way plans registered at Land Titles... we are indeed well aware of the buried infrastructure in this province.

There are over two million kilometres of buried facilities in the province but no one knows for sure.

The Alberta Land Surveyors’ Association, established in 1910, is self-governing professional association legislated under the Land Surveyors Act. It is the role of the

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ALSA to protect the public's interest and, because buried facilities have significant public policy implications, we are obliged to bring forward this issue to protect landowner rights.

Where Are We Today?

The legislation that we are governed by, when it comes to posting and marking new lot corners, right-of-way and subdivision boundaries, is spelled out clearly in the Surveys Act.

Sections 39 through 48 inclusive clearly document the requirements for monumenting new boundaries that are surveyed, and re-establishing old monuments that are lost or destroyed. The section numbers within the Act have changed over the last 95 years, but the actual content and intent has changed very little.

The definition of survey monuments and monument types is found both in the Surveys Act and in the ALSA Manual of Standard Practice, (MSP), Part C Sections 3.1 to 3.3, and will not be re-iterated here. Today, the recommended monument to mark positions and boundaries, is the 90 cm long steel iron post with a 2 cm square top. These monuments have been used in similar shape and style (with certain exceptions) for the better part of the last 125 years.

At this point in time, in our economic situation, Alberta Land Surveyors are either adding to this buried infrastructure as indicated above or are in a situation where they are locating existing facilities to be avoided. This is a daily occurrence for a large number of field survey crews in Alberta. In 2006, approximately 250,000 more survey posts will be put in the ground to mark lot corners, right-of-way boundaries, roads, powerlines, and delineate boundaries of other land and resource developments and as much as 25% of these posts will be in close proximity (10 metres or less) to some form of existing buried utility.

The history of issues with Alberta One-Call has been well documented by this Association. As a summary, back in 2002, with 182,240 survey posts planted that year, Alberta One-Call admitted that they would be unable to handle the locate requests from surveyors alone should it be the practice to call every time a survey post is put in the ground near a buried facility. Sometimes that system works and sometimes not; the timing of the two-day turn-around for survey companies, usually does not. It has been known, however, for Alberta OneCall to have a waiting period of up to four-to-six weeks for utility locates.

Because the science of locating facilities as-built is not an exact one in the majority of cases, it does not meet the specifications required by land surveyors. Direct hook-ups utilizing tracer wires can be very accurate when equipment is in place and working properly, but this is not always possible. As this has been reiterated numerous times by the

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ALSA, Alberta One-Call, as important as it is in facility location, it is not and never will be a one-stop catch-all entity.

The documentation and report from the Multi-Stakeholder Damage Prevention Legislation Task Force Position Paper dated July 23rd, 2001, brings to light a plethora of issues concerning buried facilities, the owners, the industry players and contractors. Whether it was intended or not, the position paper identifies a multi-level playing field in the buried facilities sector where not all rules and regulations are applied equally. The resource sector is well-licensed by the EUB, well-inspected, and safety is at the forefront and an increasingly critical concern in light of the high element of life threatening danger and overall record level of activity. Penalties for non-compliance are severe, and the buried utilities are usually well mapped. At the other end of the spectrum, rural utilities are not nearly as accurately mapped, nor are they registered/licensed in a time span that would be considered acceptable in this day and age (three to six months for gas co-op updates, sometimes more). In between are the urban utilities in very condensed, confined areas with both high voltage electrical, and low and high-pressure gas lines close to the surface, as well as a high level of present construction activity. It is here that most of the critical problems with buried facilities and survey posts seem more likely to occur.

Changes to the Procedures of Land Surveyors

In the resource sector, the record activity in recent years and the increasing issues of safety have prompted companies and individual practitioners to either develop stringent safety programs of their own or adopt those of the clients for which they work. If there is a case of small survey companies or small clients with no ground disturbance policy developed, then it would be wise and recommended to adopt OH&S procedures as a default, or if safety programs are available, those of your colleagues in the same business.

Awareness of ground disturbance issues has led to an increased practice of locating facilities before a land surveyor plants a survey post in congested areas. Normally, when surveying a right-of-way that is 10 to 20 metres wide in a rural area will give a surveyor a lot of leeway as to where to plant survey posts. However, the possibility of coming in contact with a shallow buried high-pressure gas or oil line or electrical cable on a battery site or lease where congestion is commonplace, is very real.

Many surveyors do much of the locating themselves, through experienced field crews. To ensure buried facilities are being located properly and accurately, a second locate by a third-party locating company is being done more and more. Alberta One-Call may be used if the land surveyor feels it is a reasonable precaution but some Alberta One-Call subcontractors will only locate to the property line.

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One thing of importance to note is that in the resource sector, even with the yearly record setting activity, there has been no recorded instance of a line puncture/hit by any survey post. Heavy construction equipment is the big hitter of lines and facilities.

The urban sector is another matter. Alberta One-Call seems to work very well in the smaller centres. However, in the larger cities, there are concerns and there have been severe delays. What land surveyors are finding is that Alberta One-Call subcontractors are reluctant to locate facilities to be tied in by field crews for planning purposes and future subdivision. Due to the economic situation, heavy workloads and staff shortages, they may only come on site for locates due to actual construction. Even their online site to request locates is not, at the present time, conducive to attaching sketches directing them to specific areas for locating. All this has led many surveyors to do their own locating, or hire out the work to locating companies. That is the state of the work situation now.

Some surveyors are covered under their client's ground disturbance policies and subdivision posting in many scenarios is done after the preliminary grading and shallow utilities (gas and electrical) have been installed. The utilities may or may not be energized at this time and sometimes the ground disturbance is still physically evident. If the present rule of no ground disturbance within one metre of a buried facility is to be strictly adhered to, then land surveyors are often in a dilemma since they have a requirement by law to post the front lot corners where the utilities usually are...but can't. In existing congested areas where a re-subdivision or condominium project is taking place, where the buried facilities have been in existence for some time, and the survey evidence has been destroyed over time and needs to be re-established, the same is true.

Should it be the case, and the land surveyor is not able to monument the exact corner as he is normally required to do by law, then he has the option of utilizing a reference monument, or a type of monument as indicated in the Manual of Standard Practice, Part C Section 3.1.3 to 3.1.5 or none at all and noting as such on the plan to be registered at Land Titles. However, if a land surveyor plants a reference post, landowners may believe they have found their actual corner and start building fences and other improvements in incorrect locations. If no monument is placed, then landowners have no information they can see in the ground for themselves.

ALSA's Expectations of Land Surveyors with respect to Buried Facilities

In the present scenario and current economic conditions of labour shortages everywhere in this province, the ALSA would consider it standard practice that a land surveyor in the resource sector develop or adopt/adhere to ground disturbance policies in regards to planting survey posts as set forth and agreed to by their clients (oil and gas companies). In the absence of such policy, it would be recommended practice that surface locates for buried facilities be done first and confirmed and that no survey post be placed closer than one metre for most buried facilities and five metres for high-pressure oil and gas lines.

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Normally, these lines are at a depth that would not make any difference to the standard practice of a land surveyor, except on leases, plant sites, oil and gas batteries or other areas of shallow depth congestion.

The municipal sector is a slightly different scenario. It would be considered standard and safe practice that the land surveyor locate and/or confirm buried facilities by Alberta One-Call, by themselves, or by a locating company, before planting any survey posts in light of any intimate knowledge of their location. However, what are the current ramifications for facility owners for buried facilities that are found to be outside of their right-of-ways? Could that still mean a sharing of liability with an Alberta Land Surveyor?

If the subsequent facility location reveals that corners to be posted fall within the one metre area of limitation as indicated by facilities owners, it is up to the land surveyor in charge to consider the safety hazards involved in placing monumentation and consider what type of monumentation to use. In the past, it has been suggested that a shorter post be used but that should only be used in rare and exceptional circumstances because of the unreliability of such a monument.

The Alberta Land Surveyors' Association and its members are acutely aware that the biggest change or challenge to surveyors is to ensure that all field staff are trained and qualified when it comes to dealing with buried facilities.

Changes to the Procedures of Facility Operators and Land Developers/Designers

It is quite evident that the resource sector is fairly well regulated. Usually with surveying a right-of-way in a rural area, there is more room to make adjustments for postings and there are no immediate outlying concerns here. Again, urban utilities are another matter.

The prevailing thought of some facility owners seems to be...now that the facilities are in the ground; this is what you must do to avoid them...wherever they are located. That, in the opinion of the ALSA, is the wrong position and only a patchwork solution. More thought and action is required before-hand and while they are being laid, (as-built surveys) or even in the design process. If buried facilities are that important, then treating them that way by addressing all the deficiencies would go a long way to ensure that critical facilities are not hit by survey posts or machinery involved in excavation.

It has been suggested that utility companies bury their facilities deeper, and for whatever reason, some have indicated resistance. It has also been suggested that a wider utility right-of-way be adopted in subdivisions to ensure facilities are well off the property lines. There seems to be resistance here as well, in that developers may not like that idea due to the fact that, despite giving more room to shallow utilities, it limits the "building envelope." The right-of way does not affect title but it does affect building envelopes and, as such, can limit

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the amount of development on a given parcel. This is something that can be resolved during the design process.

There are two major documents from the U.S. that should come to light here. One document entitled, "Best Practices 3.0" from the Common Ground Study document obtainable from the Common Ground Alliance website www.commongroundalliance.com explores two essential points. Practice Statement 2-10 indicates "continuous interface during construction." In other words, all parties are uniquely aware of what their specific responsibility is and how it affects other parties. The reporting and responsibility process becomes project internal between project groups. Thus, they are given a responsibility to each other. Better project outcomes are the result. The ALSA supports this train of thought and encourages land surveyors to give this their full consideration. By working closely with engineers, designers and their subcontractors, it will go a long way in educating those groups as to what our requirements are, and with good communication, it just might bring to light some areas where hit problems could occur...before they happen.

Practice Statement 2-11 in Best Practices 3.0 document concerns as-built drawings and post-construction mapping. The ALSA has been trying to bring this point across to the facilities sector for years. In this day and age of information technology, it is almost inconceivable that proposed or designed plans depict the location of important facilities, rather than their true or confirmed location. In November 1999, the AAMD&C (Alberta Association of Municipal Districts and Counties) passed Resolution #24-99F, requiring facility owners to submit as built plans/sketch along with easement documents to be registered at Land Titles. This was never followed-through; perhaps it was a thought before its time.

In recent at heavy equipment "sales fairs," it appears that GPS receivers have found their way with modifications and peripherals into virtually all types of construction equipment, both land and marine. The idea behind this is very simple, the more you know where the extended arm or bucket of the construction equipment is the more accurate and time-saving your project will be. For a construction trencher or backhoe laying buried facilities, assuming this information is recorded and stored, this is indeed an option for the future.

Possible Changes to ALSA Legislation and Regulations

As legislation stands now, Alberta Land Surveyors are required to monument all lot corners, deflection points, intersection points with other surveys, and to restore or re-establish any missing survey monuments that is considered primary or secondary evidence...by law and by statute (Surveys Act), and by the Manual of Standard Practice, as indicated previously. In the course of creating this position paper, the ALSA has looked at a number of options for change in legislation, regulation, and procedure. The options brought forth and discussed are as follows:

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Mandatory facility location by Alberta One-Call Subcontractors or others

If it is applicable, it should be done as indicated previously.

Change the type of monumentation used: 30 cm iron bars with standard permit numbers instead of 90 cm statutory iron posts.

It is an option. Under Part C Sections 3.1.3 and 3.1.4 of the ALSA Manual of Standard Practice, the land surveyor is given the discretion to use whatever monument he feels is practical for the situation. However, shorter statutory iron posts may not be as stable and, therefore, may not remain as accurate as longer statutory iron posts. Shorter iron posts may be more easily disturbed or destroyed.

Use coordinate-based corners in subdivisions – limited control monuments

It is an option but, under present legislation, it is not allowed. A coordinate based subdivision trial project was initiated and undertaken in 2001. For various reasons, the pilot project did not proceed. This is a long-term option and could be re-visited in a different light.

Reference posts or marks

It is an option. Under Part C Sections 3.1.3 and 3.1.4 of the ALSA Manual of Standard Practice, the land surveyor has the discretion to use whatever monument he feels is practical for the situation. Section 3.1.5 allows for reference positions, if the exact position is not able to be monumented. However, if a land surveyor plants a reference post, landowners may believe they have found their actual corner and start building fences and other improvements in incorrect locations. If no monument is placed, then landowners have no information they can see in the ground for themselves.

Development of an ALSA-specific ground disturbance policy where no new utilities can come within one metre of any survey post or proposed survey post defining a lot, section, or quarter section corner.

This is not practical now and is reactionary in nature. It may have been a good idea in the late 1960s or 1970s prior to urban boom and buried phone lines.

Revert back to pre-1988 legislation where land surveyors only monument block corners, with other monuments only at the beginning and end of curves...less posts in the ground equals less chance of hitting a facility.

It was perceived that this would be a step backwards and not what the public expects.

More use of hydrovac technology.

This is not practical now. It can be used as needed. However, land surveyors can still, within legislation, plant reference marks and different types of monumentation if unable to plant statutory iron posts at any corners.

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Abolish delayed posting plans to ensure survey posts are in the ground first prior to facilities regardless of their survival rate.

This is a possible option but it was perceived that this would be a step backwards. If survey posts are put in the ground first, a study commissioned by the ALSA in 2001 showed that there was a greater likelihood that the monuments will be destroyed during construction. The monuments will have to be replaced and, therefore, does not solve the problem. In addition, developers wish to have their subdivision plans registered before construction takes place.

Work closer with the shallow utilities groups and the developers to lobby for as-built surveys or some other form of confirmation of utility location as it is being built or as it has been exposed.

This is a very good idea. If it is a best practice in the USA according to the Common Ground Alliance, Albertans should strive for it here. As stated above, in November 1999 the AAMD&C (Alberta Association of Municipal Districts and Counties) passed Resolution #24-99F, requiring facility owners to submit as built plans/sketch along with easement documents to be registered at Land Titles. This was never followed-through; perhaps it was a thought before its time.

Have a gap of one metre between lot boundaries and utility right-of-ways

It is a possible option but legislation would have to change or Land Titles would have to make special exceptions in these cases, (reference posts being the lot corners). Otherwise, more survey posts will be required to define the utility right-of-way.

There were a couple interesting questions and thoughts that came out of the above discussions. It is well known that, from a methodology perspective, direct hook up locates are far more accurate, than the often-used differential methods of scanning that surveyors are accustomed to for locating facilities. This question was posed to Dan Jones, ALS at Enmax Calgary. If surveyors were able to access direct hook-ups in urban areas, they could do their own accurate locates, and save Alberta One-Call a lot of time and money. The reply was anticipated and understandable, "for reasons of safety and security, there is only limited and licensed access to direct hook-ups for facility locating." The Canadian Electrical Code restricts access to any electrical apparatus to a qualified, competent utility worker.

Conclusion

In the case of subdivisions and other parcels of land, including quarter sections, the defining survey monumentation is often overlooked or given no importance by utility contractors, despite the fact that it may have originated and been there for well over 120 years. It is the foundation of our parcel mapping system, used by so many groups in this province. Most landowners are aware of their lot corners as it is the land that they pay the thousands of dollars for, NOT the utilities. The monuments that surveyors place define those property boundaries.

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The Alberta Land Surveyors' Association tried to initiate a pilot project to use theoretical coordinates instead of planting monuments in the ground. The pilot project did not proceed as land developers were not keen to try it and landowners seemed to want to see where their property corners are.

In reviewing the Occupational Health and Safety Code, Section 447(4), it indicates that as-built facility record drawings can be used for buried facility location, if the ground is to be penetrated to a depth of one metre or less rather than contacting Alberta One-Call. This is a slightly flawed and misleading piece of legislation for a couple of reasons. As was mentioned earlier, this may work in the resource sector, where many of the buried facilities are mapped, are buried deeper, and all other things taken into consideration, but it is doubtful if this could be applied to the urban sector. First, most utility owners have identified that their facilities are placed at depths of 60 to 80 cm or less, well within the reach of a 90 cm statutory post. Second, these same shallow utilities are rarely if ever mapped as-built. It could, however, apply to the deeper utilities of water and sewer, but those are rarely if ever a problem.

In the rural sector, there are many more cases of as-built drawings for utilities such as gas co-ops, but the accuracy may only be +/- 15 metres. Alberta One-Call is the other option to locating and marking these if the survey firm is unable to do it themselves.

As an Association, our position is very much between a rock and a hard place. We respect all concerns voiced by the facilities sector for our own safety and for the public safety, and we have to do our best to adhere to that. Alberta Land Surveyors need to do their due diligence in avoiding buried facilities. It should be able to be done with a good combination of Alberta One-Call, good pipe locating methods, and clear communication with the respective facility groups, to ensure that they do not hit any buried lines. We cannot use legislation as a protective shield.

However, in following the new rules of others, we may end up compromising or even ignoring our own rules and regulations that we are governed by, that have been in place much longer. The public has come to expect a certain standard in the way we do things and in the way their boundaries are monumented. Three points made by the Alberta Land Surveyors' Association to a Government of Alberta Standing Policy Committee, April 16th, 2002, need to be re-iterated:

- ✓ That we need to establish regulations to require the accurate recordation of the as-built location of all buried facilities from this point forward, and
- ✓ That it is a privilege, not a right to bury anything under ground.
- ✓ Alberta Land Surveyors are custodians of one of the foundations of our Alberta Advantage - a simple, inexpensive, reliable and accurate property rights system.

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Recommendations

The Standards Committee recommends to Council that the ALSA:

1. Lobby the government, regulatory bodies and facility owners to develop a system to record the position of facilities as they are constructed.
2. Educate the government, regulatory bodies and facility owners as to the legislative requirement of the establishment and preservation of survey monuments.
3. Develop a recommended method of practice for Alberta Land Surveyors and their staff.
4. If there is a case of small survey companies or small clients with no ground disturbance policy developed, then it would be wise and recommended to adopt OH&S procedures as a default, or if safety programs are available, those of your colleagues in the same business.
5. The ALSA would consider it standard practice that a land surveyor in the resource sector develop or adopt/adhere to ground disturbance policies in regards to planting survey posts as set forth and agreed to by their clients (oil and gas companies) and the applicable legislation.
6. It should be recommended practice that surface locates for buried facilities be done first and confirmed and that no survey post be placed closer than one metre for most buried facilities and five metres for high-pressure oil and gas lines. The licensee of the pipeline and Alberta One-Call need to be contacted for any ground disturbance within 30 metres on the buried pipe in accordance with the Pipeline Regulation.