

Managing the Survey Infrastructure The City of Winnipeg Experience

By Steve Bossenmaier

Senario ... a land surveyor preparing a plan of subdivision finds the majority of the surrounding key survey monuments in the area missing or damaged. The surveyor is not surprised, this is a routine occurrence when undertaking retracement within the municipality. Signs of recent construction activity are evident. The surveyor goes about his work spending the additional time restoring the missing monuments, dealing with boundary uncertainties caused by the lack of evidence and trying to explain to his client the reason why the project is overdue and over budget. And on to the next job...

Perhaps due to the hectic times in which we live, it's human nature to leave the solutions to problems of seemingly significant proportions to others. Survey Infrastructure maintenance is a fine example of this. Unless members of the land surveying community take ownership of the problem, status quo will be the only result. Regardless of any legislation in place to protect the Survey Infrastructure there still needs to be a guardian to ensure that the legislation is actually enforced. Who other than the land surveyor is best suited to take ownership and be the guardian of the Survey Infrastructure? It is unreasonable to simply sit back and expect legislation to somehow protect survey monuments from the backhoe - it is land surveyors' inherent responsibility to control the protection process and maintenance of the Infrastructure.

A number of factors make managing the Survey Infrastructure and the associated re-imburement for replacement costs as a result of damage difficult;

- in most jurisdictions the value of protecting the infrastructure and the consequences of not doing so



has not been effectively communicated to those parties whose activities may impact the Survey Infrastructure,

- we cannot realistically expect anyone to protect the Survey Infrastructure simply on their own accord, legislation or not,
- survey monument damage can easily go unnoticed for a great length of time, as unlike other infrastructure monuments, they don't explode when impacted, there is no power failure, and because it can go unnoticed responsibility is easily avoided,
- in order to identify the party responsible for damage it must be proven that there was a monument in good physical condition prior to the excavation, the contractor was aware of the monument and the contractor was in fact the one who damaged the monument (often difficult when there are multiple contractors on the same site),
- when damage has occurred then it must be acted upon in a reasonable period of time from the date of damage to have a realistic probability of recouping costs.

For many years in the City of Winnipeg, land surveyors had been frustrated by the continual destruction of survey monuments and the seemingly endless costs incurred for their replacement. In Manitoba, provisions of the Surveys Act (Appendix "A") place the onus on the individual municipality to cover the costs of missing block outline survey monument replacement when requested by a Manitoba Land Surveyor. In Manitoba's largest municipality, City of Winnipeg, there are more than 70,000 block outline monuments, each having an approximate replacement value of \$500 - \$1000, equating to a potential liability of \$35 - \$70 million. As a consequence of years of unchecked construction activity, approximately 30% of the block outline monuments in the City have been damaged or destroyed. So in fact, we have an actual current liability of \$10 - \$20 million and no budget to address the situation.

Prior to 1999, the approach taken by land surveyors working for the City of Winnipeg when monuments were found to be damaged by a contractor was to berate the offending party and

to attempt to seek restitution. Restitution was seldom forthcoming as it was often uncertain who was responsible for the damage or the parties would simply refuse to pay. To pursue the damages was a very time intensive and more than often, fruitless endeavor. In time, such efforts to prevent monument damage simply ceased. It was essentially open season on survey monuments.

Accordingly, the concept of monument protection was unheard of in both the surveying and construction industries in Winnipeg. In 1999, we set about to change all that by altering the perception of survey monuments within the construction industry. Changing a cultural or societal perception is generally difficult but we found, with perseverance, it can be done.

One of the first steps we took was to coin the phrase “The Survey Infrastructure”. Those involved in the construction industry are familiar with infrastructure and the importance of maintaining and protecting infrastructure. As water and gas lines form an interconnected fabric, so do our systems of survey monuments. A break in the system causes problems. In adopting the term and speaking the language, we quietly elevated the lowly survey bar to “Infrastructure” status. This was somewhat similar to how Surveying Engineering was perceived prior to the introduction of the term Geomatics Engineering - it’s all about perception. Correspondence and communication from that point forward referred to survey monuments and evidence thereof as The Survey Infrastructure.

We utilize several tools to manage the infrastructure: SIPP, DA’s and the Survey Outline Monument Restoration Program.

SIPP – Survey Infrastructure Protection Program

Approximately 70,000 block outline survey monuments have been mapped in conjunction with a corresponding data base of monument information

which comprises the City of Winnipeg Survey Infrastructure GIS. The beauty of utilizing a GIS is that you can not only track monument condition in time but also construction activity, which allows us to clearly establish responsibility for Infrastructure damage.

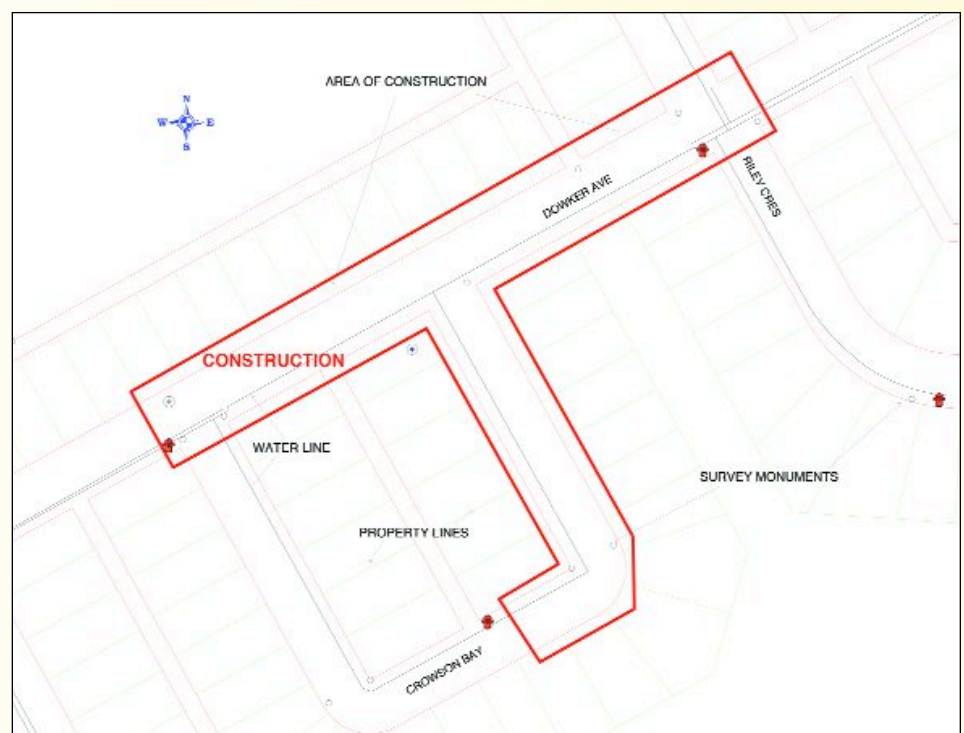
Like most other public infrastructure, a systematic “call before you dig” type of a program has been established to protect it from damage. The program offers flexibility by accepting information via telephone, fax and email. We have developed software allowing us to digitally overlay survey monument locations on engineering type AutoCAD construction drawings, enabling us to pinpoint potential danger to monuments in the construction planning stage. With this technique we can review large numbers of proposed engineering projects of all sizes in an efficient manner and provide this information back to the submitting agency. Accordingly, through realignment of proposed utility corridors, survey monuments may often be avoided in a proactive manner.

The program operates by receiving and reviewing information provided by

parties involved in proposed construction. Where there is the possibility of conflict, an appointment is generated and a survey field crew meets the contractor on site at a scheduled time and location. The infrastructure within the project site is located, marked and shown to the contractor who signs a clearance sheet indicating that he is responsible for specific monuments for the duration of the work. All attribute information is recorded in real time via laptop computers mounted in the clearance crew’s vehicle.

Upon completion of the project the contractor contacts the program for a final inspection. If monuments are found to be damaged as a result of the project the party responsible for the damage is invoiced for replacement costs.

Another key section of the Surveys Act (Appendix “A”) places the responsibility to protect survey monuments on those parties undertaking construction. When monuments are deemed to be in danger, they are to be referenced by a land surveyor. Although participation in SIPP is voluntary, our staff is vigilant in monitoring unreported construction in the course of their travels. When



The diagram above shows a simple clip from the GIS, illustrating the area of construction, the location of utilities (water lines), and the location of block outline survey monuments in relation to property boundaries, i.e. a snapshot of the “Infrastructure”.

such activity is identified, the contractor is requested to provide the name of the land surveyor who is providing protection to the monuments on the project. Generally, after noting the stunned look on the face of the contractor, we follow up by adding, unless you can provide evidence indicating otherwise, all monuments found missing or disturbed within the work-site upon completion of the job will be attributed to this project. And if this still hasn't gotten their attention we note that replacement costs can exceed \$1000 per monument. The contractor is provided with a SIPP business card and requested to contact us prior to their next job.

The basic steps to institute a program for monument protection are;

- identify primary sources of damage
- identify primary players and those in key positions to influence policy
- develop a program plan in principle
- initiate PR with primary players and others
- involve primary players in a pilot project
- develop and implement program
- on-going PR and continual program modification

Launching a pilot project involving the key parties from both the construction and land surveying sectors was found to be an ideal way to encourage dialogue around the importance of the Survey Infrastructure and to receive buy-in from all parties.

DA - Development Agreements

In Winnipeg and in various municipalities across Manitoba and elsewhere in Canada, Development Agreements have become commonplace. In areas of new development these agreements ensure that the developer does the things that the municipality asks of them. The City of Winnipeg inserts a survey infrastructure restoration clause (Appendix "B") into the development agreement as part of the subdivision

approval process. The clause basically states that you are to replace any missing monuments within your site. The developer provides the City with a letter of credit to ensure the conditions of the agreement have been satisfied. This has become a simple and effective method to protect the City from incurring the cost of restoring survey monuments once the monuments become the responsibility of the municipality.

Survey Outline Monument Restoration Program

The Manitoba Government recognizes the importance of the Survey Infrastructure to the municipalities, their residents and society in general. Accordingly, the government established an annual fund to assist municipalities with the expense of survey monument restoration on a 50/50 cost share basis.

In the City of Winnipeg the program works hand-in-hand with SIPP to ensure that the monuments are not destroyed at the same rate as they are replaced.

Conclusion

In the development of a program to manage the Survey Infrastructure it is imperative to identify and involve key people and get "buy-in". Deal with professionals in the public agencies that administer the bulk of the municipal construction, managers in the provincial government, professionals in the private sector who oversee construction projects and professionals through their governing bodies. Let the message flow from the top down to those doing the actual digging.

In developing our program in the City of Winnipeg, we;

- met on numerous occasions with the primary engineers in the City's Public Works Department and the Water and Waste Department. Initial reluctance to change was overcome with dialogue and these parties became fundamental in the

ultimate success of the program.

- met with engineers from all major engineering firms to discuss their issues and to solicit their support.
- met with engineers and representatives from all major utilities in the City of Winnipeg.
- launched a pilot project involving members of the private land surveying and engineering communities, and land surveyors and engineers from the City of Winnipeg. The project investigated different survey monument protection methodologies and resulted in formulating the template for our current program (SIPP).
- assisted in the establishment of a joint board with the Association of Professional Engineers and Geoscientists of the Province of Manitoba, and the Association of Manitoba Land Surveyors. We continue to serve on the board today. The board has been quite active and has published several key resolutions including several on survey monument protection.
- meet annually with representatives of the Manitoba municipalities and the Property Registry (Land Titles) to review the terms of the Survey Outline Monument Restoration Program.
- continue to provide literature to all parties undertaking construction in the City regarding SIPP.
- Established a web page for the SIPP program:
www.winnipeg.ca/ppd/surveys.stm.

In a nutshell, if we want others to value the Survey Infrastructure, then we must have them understand the value of protecting the Infrastructure and the consequences of not doing so.



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APPENDIX A

Protection Legislation

The Land Surveyors Act C.C.S.M. c. L60

Offence and penalty

58(1) Every person who knowingly or willfully defaces, alters, or removes, any mound or landmark, post or monument, placed by, or under the supervision and on the instructions of, a Manitoba land surveyor or a Dominion land surveyor under the *Canada Lands Surveys Act* (Canada), to any limit, boundary, or angle, of any township or section, or any legal subdivision, lot, parcel of land, in Manitoba is guilty of an offence and liable, on summary conviction, to a fine of not more than \$100. or to imprisonment for a term of not more than three months or to both.

The Surveys Act C.C.S.M. c. S240

Outline monuments public property

3 All outline monuments, whether defining directly any line or limit or indirectly defining a line or limit as a reference point, are equally public property, and as such shall be kept available to surveyors at any time, and shall not be unnecessarily interfered with by any person or municipality.

Persons and municipalities to protect outline monuments

4 All persons and municipalities when making improvements, public or otherwise, shall protect all outline monuments from being disturbed in the course of the improvements, and shall provide traps in

pavements or sidewalks covering the monuments when necessary to make them easily accessible.

The Criminal Code of Canada R.S., 1985, c. C-46

Interfering with Boundary Lines

442. Every one who willfully pulls down, defaces, alters or removes anything planted or set up as the boundary line or part of the boundary line of land is guilty of an offence punishable on summary conviction.

Interfering with International Boundary marks, etc.

443. (1) Every one who willfully pulls down, defaces, alters or removes

(a) a boundary mark lawfully placed to mark any international, provincial, county or municipal boundary, or

(b) a boundary mark lawfully placed by a land surveyor to mark any limit, boundary or angle of a concession, range, lot or parcel of land,

is guilty of an indictable offence and liable to imprisonment for a term not exceeding five years.

Restoration Legislation

The Surveys Act C.C.S.M. c. S240

After improvements monuments to be restored to original location

5 Where any improvement is to be made of such a character as to alter permanently the surface grade or to otherwise disturb or render practically inaccessible any outline monuments, the municipality or other person responsible for the improvement shall have a survey made under the direction of the registrar-general referencing the monuments; and during the course of completion of the improvements the monuments shall be

restored to their original location or suitable monuments substituted therefor, to the satisfaction of the registrar-general.

Remedying of disturbance of monuments

6 The registrar-general, upon receiving a report from any surveyor indicating the disturbance in any way of any outline monument, may require the municipality in which the monument is situated to remedy any such disturbance of monuments or surveys to his satisfaction; and if, upon being required to do so, the municipality refuses or neglects to comply with the requirement, the registrar-general shall remedy the disturbance to his satisfaction and the cost thereof shall be paid in the first place out of the Consolidated Fund, and subsequently collected from the municipality through the minister; but if the cost will exceed the sum of \$1,000., the registrar-general shall not take the proceedings without the approval of the Lieutenant Governor in Council.

APPENDIX B

Sample Development Agreement

Clause:

Payment to the City of a deposit/letter of credit for survey monument replacement costs in the amount of \$_____. Subsequent to the completion of any works that may damage the survey monuments in the subdivision the applicant will provide the City and the Winnipeg Land Titles Office, a Survey Monument Replacement Certificate confirming the positions of all survey monuments within the planned area. Upon receipt of this Certificate, the deposit/letter of credit will be refunded.

Sites to See

GeoConnections Discovery Portal

<http://geodiscover.cgdi.ca/>

“Enabling discovery and access of Canada’s geographic information on the Internet. The GeoConnections Discovery Portal is your gateway to millions of geospatial data products. Browse metadata records or search by subject, coverage or product type to find, evaluate, visualize and access the geospatial data you need.”