

GUIDELINE

**Services of the
Engineer Acting Under
the Drainage Act**

1998

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INTRODUCTION

This guideline is recommended by the Association of Professional Engineers of Ontario and by the Association of Ontario Land Surveyors but is not to be considered as mandatory. Under the *Drainage Act*, an engineer is defined as either a professional engineer (a person who is a member of the Association of Professional Engineers of Ontario—P.Eng.), or a surveyor (an Ontario Land Surveyor—O.L.S.) registered under the *Surveyors Act*, as the case may be. The definition of an engineer in this guideline is therefore different from that of a professional engineer as defined in the *Professional Engineers Act*.

Under the *Drainage Act*, the engineer is customarily called upon to “act” for the purpose of preparing a report for a new Petition Drain (commonly called a Municipal Drain) or for the repair or improvement of an existing Petition (Municipal) drain. Less frequently an engineer may be appointed to prepare a report for the construction of a new Mutual Agreement Drain or a new Requisition Drain or to report on abandonments, land subdivisions or maintenance of drains.

In order to carry out these responsibilities properly, the engineer must have a thorough knowledge of the *Drainage Act*, a familiarity with common law and other provincial statutes respecting drainage, an understanding of drainage effects, and expertise in design and construction of drainage facilities. Engineers should also be familiar with the Design and Construction Guideline prepared by the Ministry of Agriculture and Foods, and prepare and process their reports in accordance with that guideline noting where their reports are not able to be consistent with that guideline.

This guideline is intended to assist the engineer in providing services in connection with the *Drainage Act* with particular emphasis on petition drains. Where applicable, distinction will be made between the more common drain which serves primarily rural lands and the less common drain affecting predominately urbanized lands.

Not all sections of the *Drainage Act* are necessarily discussed herein and engineers must at all times be familiar with the application of the Act in general and to their particular project specifically.

In many instances throughout this guideline, the engineer’s activities are set out using the imperative “shall.” This usage reflects the obligations of the engineer under the *Drainage Act*.

Engineers should satisfy themselves that the instructions received from the initiating municipality are in accordance with the Act. If they feel the instructions are unclear, they should advise the municipality.

This recommended guideline should not necessarily apply rigidly to all drainage works constructed under the *Drainage Act*. On small projects the time and cost of implementing all aspects could be prohibitive, whereas on larger projects even further matters may require the engineer’s attention.

SUGGESTED FEES

All services to be provided by the engineer should be provided on a basis of time plus reimbursement for defined expenses. In some instances, engineers will be expected to estimate their fees in advance of incurring same, and set forth such estimate in their drainage report.

PETITION DRAINS

GENERAL

An engineer is appointed under section 8 of the *Drainage Act* by the Council of an initiating municipality for new petition drains.

The engineer can be similarly appointed under section 74 and 78 of the Act to bring in reports for repair or improvement of existing petition drains.

The engineer can be asked to prepare other miscellaneous reports in connection with petition drains in accordance with other sections of the Act.

If it is a corporation, partnership or association that is appointed, the firm must notify the municipality within 10 days of the particular engineer who will have charge of the project. The municipality must also be advised if the designated engineer should leave his or her firm. In this case the municipality must be advised of the name of the engineer's replacement.

Major categories of work involved with new petition drains include the on-site meeting, the preliminary report if required, the field survey, the office design, the plan and profile preparation, the report preparation, the report presentation, contract tendering, construction supervision and post construction attendance.

ON-SITE MEETING

In accordance with section 9(1) the engineer shall have the clerk of the municipality notify all owners in the area requiring drainage of the time and place of the site meeting. The engineer should examine the petition and assist the clerk if necessary to ensure the notices go to all affected public utilities and road authorities, to any drainage commissioners or superintendents and to any other agencies known to be concerned—for example, the Ministry of Natural Resources, conservation authorities, and local municipalities, county, regional or other provincial authorities.

At the on-site meeting, the engineer shall determine the area requiring drainage, the type of work requested by the petitioners and shall then determine if a sufficient petition has been submitted. If the petition is sufficient, he or she shall proceed further but if it is not, he or she shall notify the municipality in accordance with Section 9(4) of the *Drainage Act*. At the on-site meeting, all available details of construction concerns or hazards should be determined from those present. It is always highly desirable that the proponents drainage requirements and land use intentions be ascertained and documented. Each owner or authority should be interviewed and if any are not present but are deemed to be affected because of work being done on their land, or because of other anticipated concerns, the engineer should attempt to contact them.

At the on-site meeting the engineer should ensure that the petitioners and/or any owners on whose land the drainage works will be constructed are aware of the location where construction may occur and that there may be substantial assessments involved.

PRELIMINARY REPORT

The engineer shall prepare a preliminary report under section 10 of the Act when so directed by the municipality if a sufficient petition for a drainage works has been submitted and confirmed by the required on-site meeting. In some situations the municipality, upon being requested by others, must in turn direct an environmental study or benefit cost statement as part of the preliminary report. Preliminary reports may be prepared for projects authorized pursuant to either section 4 or section 78 of the *Drainage Act*.

Information gathered from the on-site meeting, from existing drainage plans and reports, from topographic maps, from aerial maps, and from preliminary site inspections, etc., can be used in preparing the preliminary report. Engineers should determine at the on-site meeting the degree of detail required and the alternatives, if any, to be studied. They should explain what items cannot be included in a preliminary report.

The preliminary report shall state the estimated cost of the drainage work requested by the petitioners, and should state the assumptions used in making the cost estimate and the variables which would alter a final cost estimate. Criteria described in following sections of this guideline should be used in establishing the preliminary design. An estimate of the total watershed to size the drainage works and determination of the outlet are required. The preliminary report, in addition to including an estimate of all construction works anticipated should provide an estimate of the allowances to be given and the engineering fees to be incurred using percentages based on past reports. The engineer should also prepare a plan based on existing topographic sheets, drainage plans or mosaics to show the watershed area, lots and concessions, the location of the proposed drain and the owners' names. There is no requirement to include a profile with a preliminary report. The report should also state that all quantities and costs are estimates only.

Where the preliminary report is for an urban drainage works, in addition to the other procedures established herein, both the adopted design standards and the design standards of the affected municipality, when different, should be set forth, the applicable zoning bylaw and official plan land use designations should be defined, and the municipal, county, regional and/or provincial engineering departments should be contacted to:

- ◆ obtain full information on existing and proposed municipal services, roads, utilities and other facilities;
- ◆ determine the applicable standard criteria for design, the extent of engineering services to be provided and the manner of presentation;
- ◆ determine the applicable practice for sharing of costs with other public authorities with private developers and with the public, and
- ◆ obtain from representatives of utility companies, railways, road authorities, etc., locations of their facilities, proposed changes and requirements with regard to the proposed drainage scheme.

Wherever possible, the work description, cost estimate and limitations should be included on one or two pages of the report, the plan on another and the profile, if any, on a further page.

The preliminary report may examine one or more alternatives and equal detail should be provided for each alternative studied.

If the preliminary report is to include an environmental appraisal, the engineer shall include it. In preparing an appraisal, the engineer should have due regard to the *Environmental Assessment Act*, and in particular to the definition of “environmental.” The engineer should consult with others such as representatives of the applicable offices of the Ministries of Agriculture and Food, Natural Resources, and Environment and also with representatives of applicable conservation authorities. The report should indicate the body requesting the appraisal, the costs of the appraisal, the purpose and need for the project, a general description of the environment, possible alternative methods in carrying out the project, the effects on the environment that each alternative has, and, lastly, an appraisal of the advantages and disadvantages of possible drain construction having regard to the environment. The costs of the environmental study are to be kept identified separately from other preliminary report costs.

If the preliminary report is to include a benefit-cost statement, the engineer in preparing such should consult with each landowner to be benefited by the drainage works in order to determine and review:

- ◆ present land uses;
- ◆ present crop yields;
- ◆ anticipated land uses and yields upon completion of the drainage works;
- ◆ other land improvements required in addition to the drainage works;
- ◆ other expected benefits and costs to be experienced, and
- ◆ the average level of improvements likely to be implemented.

The engineer should also review soils maps and other available information to evaluate soil types, ground water levels and the effects on same due to the anticipated drainage works. Engineers should consult with representatives of the Ministry of Agriculture and Food as required, and should evaluate the costs or benefits resulting from either decreased or increased access, safety and environmental considerations. The statement report should identify:

- ◆ the drainage works proposed;
- ◆ alternatives considered;
- ◆ the body authorizing the study;
- ◆ the costs of the statement report;
- ◆ a description of the general land uses and environment of the area;
- ◆ a detailed description of each property or block of the area indicating existing and anticipated agricultural (or other) benefits and costs;
- ◆ calculations to show net annual benefits and costs per property;
- ◆ calculations to show net cumulative present day values of benefits and costs, and
- ◆ a preliminary appraisal of the benefits versus costs.

The final report outlining the project and other development costs versus total benefit does not have to be property by property.

With respect to assessments, the preliminary report is not to include an assessment schedule. It may discuss principles of assessment or broad allocations of assessment, but individual assessments are not to be included. Assessment matters may be discussed further at the consideration of the preliminary report.

If engineers are requested to include items in their preliminary report that are not provided for by the Act and this discussion, they should ensure that Council agrees with the preparation of such additional information, and should ensure it is in a separate report and that the costs for such are kept separate and are agreed to before attendance to the work.

Once the preliminary report is prepared, the engineer should confirm with the clerk the number of copies required, and should ensure that the clerk is aware of the landowners and agencies to whom a copy of the report should be sent.

Engineers should determine if they are to appear at the Council meeting to discuss the preliminary report and, if so, they should be prepared to answer questions on the report. They should be prepared to give estimates of assessment per property based on past experience or such other information as is available provided the limitations of such estimates are explained even though the Act does not require such information to be provided.

FIELD SURVEY

The engineer's field survey should include the following items of work, some of which are specifically required by the *Drainage Act*.

- ◆ establishment of a bench mark system for permanent vertical control of work and preferably on Geodetic Control wherever practical;
- ◆ planting of numbered survey stakes at intervals (customarily 25 to 30 metres) to show drain route and to identify position along drain;
- ◆ determination of vertical and horizontal data regarding railways, roadways, laneways, pipelines, overhead utilities, underground cables and associated installations and other possible obstructions plus other data to allow analysis of culvert hydraulics;
- ◆ establishment of sufficient lines and ties for permanent horizontal control of work;
- ◆ determination of existing ditch cross sections and high water level marks;
- ◆ determination of existing ditch bank and bottom elevations, ground elevations, elevations of low areas requiring drainage and elevations of intercepted drains where evident;
- ◆ determination or confirmation of watershed limits of drainage areas and portion thereof;
- ◆ notation of land uses, soil types, special features and problem areas;
- ◆ determination of contours of rock, shale or hardpan where same is known to be at a depth to affect construction;
- ◆ location of other existing major drainage works within the watershed, and
- ◆ location of water levels in wells where shallow surface wells are known to exist.

For urban drains in addition to the above items, the engineer should determine the following:

- ◆ the location of all underground (or overhead) utilities (such as gas lines, cables, waterlines, etc.) existing or proposed;
- ◆ cross sections at sufficient intervals;
- ◆ adjacent basement floor elevations, and
- ◆ subsurface investigations to determine backfill and dewatering requirements and possible effects on private wells, etc.

The field work is best done at a time of year when the required information may be readily determined. If the engineer feels that delaying the survey until conditions permit affects the six months filing period referenced by section 39 he or she should contact the initiating municipality. Any landowner whose property will be affected and any municipal drainage superintendent or commissioner should be advised of the time of survey in case he or she wishes to be present during the survey.

OFFICE DESIGN

The engineer's office design procedures should be in accordance with the Design and Construction Guidelines prepared by the Ministry of Agriculture and Food and should include the following:

- ◆ applicable municipal, regional or provincial design standards, local soils maps, aerial photographs, topographic sheets, and existing drainage reports should be consulted;
- ◆ planning documents that may show existing or changes in land use, road or utility relocation should be reviewed;
- ◆ affected watershed areas should be calculated;
- ◆ draft profiles should be plotted;
- ◆ boundaries of, locations of, owners of, and areas of all properties in the watershed area should be determined;
- ◆ consideration of the effects that the drainage work has on downstream flows;
- ◆ estimate of design rates of flow for open and closed drains;
- ◆ determination of cross sectional dimensions of required closed and open drainage works should be calculated;
- ◆ culverts should be chosen of sufficient capacity to accept the design flows and of sufficient structural strength to withstand anticipated loads;
- ◆ special drainage appurtenances should be designed, where necessary, to reduce flow velocities to reduce or prevent erosion, to prevent or reduce sedimentation, to improve the performance of the drainage works for its intended use, to overcome special problems, and to manage storm water runoff through detention or retention facilities;
- ◆ calculations of quantities of excavated material, clearing required, land areas required for drain construction, allowances to be made, watershed areas and,
- ◆ identification of current and applicable unit prices for construction and material costs.

Other bodies or agencies should be consulted as the need arises.

REPORT PREPARATION

The report should include summaries of the following:

- ◆ the terms of reference, the area requiring drainage, the lands affected by the proposed drain, the existing drainage works serving the lands, the problems found with any existing drains, the problems the owners wish to overcome, the alternatives considered to correct identified deficiencies, the relative merits of each alternative, the recommended alternative, the benefit-cost statement and the environmental appraisal if any, the allowances to be made in accordance with each section of the Act, the estimate of construction and material costs in sufficient detail to identify the cost of each length of the drain, actual engineering costs to date and estimates of engineering costs to complete the drain, the costs in each municipality and across a boundary road, the categories of assessment, the reasons for any special assessments, the actual schedules of assessment, the methods of maintaining the drainage works, the abandonment of an drains made redundant, the specifications to which the drainage works are to be built, the plan, the profile and the standards or details of any special drainage appurtenances or construction areas or any other specified item if required.

The plan for a rural drain should be prepared in a professional manner at suggested scale of approximately 1:10,000 unless the drainage area is smaller, making a large scale practical or unless the drainage area is of such size to make inclusion on a standard drawing impossible thereby necessitating a smaller scale. Graphic bar scales should be used where drawing reductions may be made. The plan should include the following:

- ◆ north arrows, scales, date, legend, lots, concessions, municipalities, ownership lines and names, roadways, railways, pipelines, natural watercourses, proposed drain location, flow directions, horizontal control, existing drains in or adjacent to the drainage area, location of special appurtenances, the watershed of the drainage works and parts thereof, special construction notes or warnings, and the professional stamp of the engineer, the engineer's signature and the date.

The profile for a rural drain should be drawn in a professional manner to a suggested scale of 1:5,000 horizontally and 1:50 vertically unless details require a larger scale and space permits such.

The original ground should be profiled as staked: any adjacent ditch bank, ditch bottom, ditch water levels, intercepted drainage works or other utility should be shown. The design profile grade of the new ditch bottom or closed drain invert should be shown as well as the percentage of grade, and the vertical control of the design grade. All established bench marks should be included and the depth of cut from staked locations to new profile grades should be shown to indicate the depth of the proposed facility in relation to any existing drainage works, and/or the natural ground. The dimensions of each part of the drainage works should be included and the location of any special appurtenances should be shown if possible.

The drawings for urban drainage projects will be of two basic types: those relating to work within the road allowances, and those relating to work entirely off road allowances. For urban projects the following items should also be observed:

- ◆ the drawings should generally show plan and profile augmented with cross sections and detailed drawings as required;
- ◆ plans and profiles should be drawn in a professional manner and to a suggested horizontal scale of 1:500 and a vertical scale of 1:50 for built-up areas and 1:5,000 and 1:50 respectively for rural areas subject to the requirements of the municipality. Graphic bar scales should be used where drawing reductions may be made. The north point should be shown on each plan, together with the names of the roads and streets, lot numbers, concession numbers, property lines, owners' names, the limit of the drainage area, the total area of a person's lands and the area of such lands included in the drainage areas;
- ◆ design details of standard units of construction such as road sections, manholes, catchbasins, guiderails, and pipe bedding, should be presented on standard drawings at common fractional scales;
- ◆ plans should show the location of all existing utilities, both underground and on the surface which intersect the drainage works or are in close proximity thereto, all existing topographic features including embankments, buildings, mature trees, entrances, signs, fences, etc., which intersect the drainage works or are in close proximity thereto; and
- ◆ profiles should show the existing surfaces profile and the approximate location and elevation known existing utilities which will be intersected by the new work. The profile drawing should indicate any finished road surface profiles. The profile drawing should also show the invert and overt profile of any pipes. For open drains, elevations should be shown as well as typical cross-sections.

The specifications for both rural and urban drains should reference all works shown on the drawings or for which the engineer is responsible. They should be complete, clear and concise, with a statement setting forth the general scope of work followed by an **adequate description of** the various classes of work, segregated by trade under the proper sections and headings. **The quality of materials and workmanship required of the contractor should be described in detail.** Each section and heading should be identified for easy reference and indicated in a table of contents. Where applicable, standard specifications for material should be used and the nomenclature should be the same as that used on the plans.

Prior to completing and submitting the report to the municipality, engineers should determine the number of copies to be submitted, and the involvement expected of them in following the stages or phases.

In the report, engineers should include their costs both as incurred and as estimated to be incurred. Estimates of costs to complete the project should be included once it has been determined by the engineers, through the client, what their further involvement is expected to be on the project. Costs incurred for environment appraisals and benefit cost statements are not to be included with other costs as they are to be charged to the requesting parties.

The engineer shall observe the requirements of section 39 with regard to the six month time period allowed for filing of the report commencing from the date of appointment, unless extended by the municipality.

For urban drainage project, the engineer should submit preliminary plans, specifications and schedules, and applications for approval to the municipality and to public authorities, as required. Engineers may be required to attend meetings at the offices of these public authorities to discuss designs and to provide explanations for the purpose of furthering the applications toward approval.

For both urban and rural projects where, in the opinion of the engineer, the petitioned drain is not practical, engineers shall prepare their reports to state such in accordance with section 40 of the Act.

REPORT PRESENTATION

Under this category, possible services to be provided by the engineer include attendance at the consideration of the report, attendance at the Court of Revision, advice to the municipality regarding the steps to be followed up to the time of completion of construction, and attendance before the Drainage Tribunal or the referee on the matter of appeals. Attendance on behalf of appeals beyond the Court of Revision cannot be anticipated and costs should not be provided in the report for same; however, as indicated previously, engineers should determine prior to the report completion and filing, the municipality's wishes regarding their involvement at drain considerations and Courts of Revision.

If attendance at the consideration of the report is provided, engineers should be prepared to summarize their report, to entertain any questions regarding any aspect of the report, to comment on suggested changes and alternatives and to advise on procedures to be followed if amendments to the report are required. Engineers may be required to give evidence as to how any or all assessment(s) in their report was determined if they are to appear before the Court of Revision or the Drainage Tribunal in an assessment appeal.

CONTRACT TENDERING

As stated the engineer should determine the level of involvement expected in this work phase prior to filing of the report. The duties of the engineer in this category may include:

- ◆ preparation of the tender documents including preparation and/or duplication of forms of tender, schedules of quantities, articles of agreement, specifications, plans and profiles;
- ◆ preparation and placement of advertisements;
- ◆ review and recommendations of tenders;
- ◆ attendance at execution of contract documents;
- ◆ assistance in filing of performance securities, and
- ◆ routine completion of any permits, applications, or licences.

SUPERVISION OF CONSTRUCTION

The general outline of services to be provided by the engineer, if he or she is requested to provide supervision of the project during construction is:

- ◆ to ensure that materials used and results achieved by the contractor are acceptable with respect to the contract documents;
- ◆ interpretation of the requirements of the contract for both the municipality and the contractor. Where an issue develops between the two parties to a contract, the engineer may give a decision on the issue in accordance with the terms of the contract, and
- ◆ general administration of construction as defined in the engineer's discussions or agreement with the municipality.

Some specific functions to be provided by the engineer in the office during construction are as follows:

- ◆ tabulating contractor's progress and final requisitions and issuing progress certificates to the municipality;
- ◆ review shop drawings submitted to the degree necessary to assure the municipality that the contractor's work is in compliance with the design requirements;
- ◆ consider and advise on the use of alternatives in methods, equipment and materials proposed by the contractor;
- ◆ issue change work orders for extra or less work when required and as permitted within the limitations of the bylaw and the *Drainage Act*;
- ◆ provide advice and maintain adequate records related to the contracts;
- ◆ if the municipal record is completed, modify contract documents to show the "as built" work and

provide copies of these drawings to the municipality. The information on which modifications are based will be obtained during construction;

- ◆ issue a certificate of completion when the work is substantially complete, and
- ◆ when total costs for the project are available, to prepare a revised assessment schedule if specifically requested and notwithstanding that the municipality must prepare such revised schedules.

Some specific functions to be provided by the engineer in the field during construction should be as follows:

- ◆ meet with the contractor, field check identified problem areas, and ensure sufficient control points and stakes are present;
- ◆ make visits at an interval approved beforehand with the municipality to the site during construction to ascertain that the work is being executed in reasonable conformity with plans and specifications. If required and approved by the municipality and felt necessary by the engineer, full time supervision should be provided;
- ◆ arrange for the testing and inspection of materials and work by an authorized inspection and testing company when required;
- ◆ arrange job meetings as deemed necessary;
- ◆ approve construction schedules and report progress to the municipality if required;
- ◆ provide a final inspection, and
- ◆ follow up on deficient items to ensure their correction.

If full time supervision is required, the further duties of the engineer during construction may include the following:

- ◆ provide reference lines and elevations to the contractor and, where necessary, check the contractor's line and grade;
- ◆ carry out continual detailed inspection of construction to ensure that all work will satisfy the intent of conform with the design and will substantially conform with plans and specifications;
- ◆ arrange for or carry out all necessary testing and inspection of materials and equipment installed;
- ◆ investigate, report and advise on unusual circumstances which may arise during construction;
- ◆ carry out final inspection at the conclusion of the construction contract and at the end of the maintenance period as part of the acceptance program of the municipality, and
- ◆ obtain field information for the modification of contract drawings to show the work "as built."

POST CONSTRUCTION ATTENDANCE

Possible work items to be included under this category include authorization of contractor's holdback release, assistance in subsidy applications, and review of subsequent questions arising on the drain during the warranty period of the construction.

REPORT PREPARATION FOR MAINTENANCE

The engineer may be appointed under section 74 of the Act to prepare a report for the repair or maintenance of an existing drain. All proceedings are comparable to those described in the preceding sections except that the engineer must consider the previous report applying to the drainage works and shall only report on a works to reconstruct the drain or any part thereof to the original line, depth or size and shall assess the cost of the proposed repair work over the upstream watershed area in accordance with the previous report's assessment schedule (unless such has been amended or is to be amended in accordance with section 76 or unless otherwise determined by the engineer).

REPORT PREPARATION FOR IMPROVEMENT

The engineer may be appointed by a municipality under section 78 of the Act to prepare a report for a works to include the improving, altering, reconstructing, or extending (downstream), or combining of one or more existing drainage works. The steps outlined in the preceding sections should be followed.

Prior to the commencing of work for such an appointment, or at the time of the on site meeting, the engineer should determine if the works requested will fall within the scope of section 78.

MISCELLANEOUS SERVICES TO BE PROVIDED

In connection with petition drains and in conformity with the *Drainage Act*, the engineer may be requested to provide the following services:

- ◆ file a report in accordance with section 62(2) when insufficient funds have been raised to complete a drainage works in accordance with the original bylaw and it involves more than one municipality;
- ◆ apportion an assessment between the parcels resulting from a land subdivision in accordance with section 65;
- ◆ advise on and prepare a report assessing a land that connects to a drainage works subsequent to its completion that is not otherwise assessed for the drainage works, in accordance with section 66;
- ◆ in accordance with section 76, prepare revised schedules of assessment for maintenance purposes of existing drains;
- ◆ in accordance with section 77, report on the relocation of an existing drainage works off of a public road allowance, and
- ◆ in accordance with section 84, prepare a report on the abandonment of an existing municipal drain.

The following are examples of additional or special services which may be required by the municipality on urban drainage projects (and in some cases on any drainage project) and which are not provided for specifically by the *Drainage Act*:

- ◆ feasibility studies embodying consideration of alternate methods or routes to accomplish the desired result. These studies may relate to the broad aspects of community planning and may include consideration of soils reports, a preliminary design, cost estimates and advice as to the various subsidies, grants and methods of financing open to the municipality;
- ◆ reports of a detailed nature, including drainage reports, investigation of existing works, elaborate surveys capital works budgets, and submission to public authorities;
- ◆ public hearings before the Ontario Municipal Board, Environmental Assessment Board, and other public authorities regarding the financial capability of the municipality, the effects of the project on the environment, the method of charging for the works and property evaluation for easements;
- ◆ appearance in litigation, arbitration proceedings and attendance at hearings on behalf of the municipality;
- ◆ topographic survey;
- ◆ negotiations for easements;
- ◆ the allocation of costs between the initiating municipality and other municipalities, authorities or private interests, including the administration of extended financial arrangements, computation of principal and interest and preparation of accounts;
- ◆ additional services required by reason of contractor insolvency;
- ◆ changes in design made necessary or desirable by factors beyond the control of the engineer
- ◆ preparation of special progress certificates and final certificates for subsidy payments, grants, or rebates from C.M.H.C., M.O.T. or other authorities, and
- ◆ carrying out prolonged negotiations with public authorities on behalf of the municipality.

AUTHORITIES THAT MAY BE OR ARE AFFECTED BY THE ENGINEER'S REPORT

The following is a partial list of public and private authorities and examples of when such agencies may be involved, which may change from time to time:

- a) **Ontario Provincial Government**
Ministry of Agriculture and Food;

- ◆ advice, where requested and where possible to municipalities, engineers and landowners when working with the *Drainage Act*;
- ◆ application for grants related to eligible drainage works and review of engineer's reports for such works, and
- ◆ administration of the *Drainage Act*.

b) Ministry of the Environment

- ◆ applications for works in connection with waterworks and water pollution control systems;
- ◆ wells;
- ◆ conservation of surface and subsurface water;
- ◆ urban and storm water management policies;
- ◆ *Environmental Assessment Act*, and
- ◆ pollution of drains.

c) Ministry of Transportation

- ◆ all cases where the project is eligible for a grant or maintenance subsidy from the Ministry or where work will be done on a highway or other area under control of the Ministry, and
- ◆ Ontario Highway Bridge Design Code.

d) Ministry of Housing

- ◆ zoning, official plans, subdivisions and consents (one lot subdivisions), and
- ◆ Ontario Municipal Board for approval of financing of drainage works by municipalities.

e) Ministry of Natural Resources

- ◆ construction or building water lots. Construction in areas restricted under the *Public Lands Act*. Pipelines, sewers and watermains over navigable waters. Approvals under the *Lakes and Improvement Act* and *Federal Fisheries Act*, and
- ◆ flood plain management policies.

f) Ministry of Labour

- ◆ general building construction under the *Construction Safety Act*, elevators, tunnels, caissons and pipelines;
- ◆ *Trench Excavator's Protection Act*.

g) Ministry of Intergovernmental Affairs

- ◆ review and payment of all provincial assessments including assessments to the M.O.T. and provincial crown lands, and
- ◆ advice to local municipalities regarding financing of drainage works.

h) Other Agencies

- ◆ Canada Mortgage and Housing Corporation;
- ◆ Federal Department of Transport (navigable waters, aviation height restrictions);
- ◆ Federal Department of Energy Resources (pipelines);
- ◆ Canadian Transport Commission (railway crossings);
- ◆ railway companies;
- ◆ conservation authorities;
- ◆ local medical officer of health;
- ◆ private and public utility companies or commissions;
- ◆ Department of Veteran Affairs, and
- ◆ Conservation authorities–flood plain regulations under the *Conservation Authorities Act*.

MUTUAL AGREEMENT DRAINS

If an engineer is requested to assist in the preparation of an agreement for a Mutual Agreement Drain, the engineer should determine from the client(s) which of the following services he or she should provide and to what detail:

- ◆ a field survey to prepare a profile;
- ◆ the preparation of a plan of the drainage works;
- ◆ an estimate of cost of the drainage works;
- ◆ any specifications to govern the drainage works;
- ◆ a description of the drainage works;
- ◆ the proportions of construction, improvement and maintenance costs to be borne by each party to the agreement;
- ◆ preparation of the agreement, and
- ◆ advice regarding legal and registration requirements of the agreement.

Prior to the commencement of any of the above work, the engineer should ensure that where his or her fees are to be paid by the parties to the agreement that all parties agree to the terms of reference provided to the engineer. The engineer should only provide information on the plans and profiles as is necessary to guide construction, to ensure location determination and to illustrate the scope of work proposed. The cost estimate should be of such detail to facilitate determination of cost for any unit of length. The engineer's costs should form part of the cost estimate.

REQUISITION DRAINS

When an engineer is appointed under section 3(6) of the *Drainage Act* to make an examination of an area for which a requisition form has been filed under Section 3(1), the engineer should do the following, some of which are specifically required by the *Drainage Act*:

- ◆ review the requisition and its compliance to the Act;
- ◆ cause the clerk of the municipality to properly notify each landowner described in the requisition and each public utility known to be involved;
- ◆ examine the area and interview sufficient owners and study sufficient documents to prepare a preliminary report as described under the Petition Drain section of this guideline;
- ◆ the preliminary report shall include a benefit-cost statement and an environmental effect statement and an estimate of project costs;
- ◆ the benefit-cost statement should be based on the methods described in the previous section of this guideline. The engineer should determine the present land use practices, should estimate the values of yields from such practices, should estimate possible and likely future land use practices and the corresponding yields, should consider increased production costs, additional land improvement costs, costs of this project, should assess other benefits and outlets, should compute net annual costs and benefits and should appraise the total benefits versus the total costs;
- ◆ the environmental statement should involve discussions with only those agencies and authorities that the engineer judges to have sufficient information or assistance, should describe alternatives if any, should include a brief description of the existing environment, and of the effects each alternative will have on the environment and, lastly, should appraise the advantages and disadvantages of the drain construction with respect to the effects on the environment;
- ◆ the preliminary report shall include a cost estimate of the works including the estimated fees of the engineer. As well, the limitations to and assumptions made regarding the cost estimates should be identified. Plans and profiles are not required but should be provided if the engineer deems such necessary;

- ◆ the engineer shall identify the area requiring drainage and the parties that would have to petition for same if the owners affected by the Requisition Drain were to decide to continue the project as a Petition Drain rather than as a Requisition Drain;
- ◆ the engineer should determine if he or she is to provide assistance to the clerk to ensure each affected owner receives a copy of the preliminary report, if he or she is to attend the Council meeting to consider such report, and if he or she is to advise further regarding proceedings under this section of the Act;
- ◆ if the engineer attends the council meeting, the engineer should be prepared to answer questions on construction and, in general terms, possible assessments if the project proceeds;
- ◆ if the engineer is instructed to prepare a final report on the requisition, the steps and procedures outlined at pages 4 to 9 (Field Survey to Supervision of Construction) of the Petition Drain section of this guideline should be followed with some exceptions including;
 - a) there is a set limit to the cost of the works that can be constructed as outlined in section 3(3) and 3(4);
 - b) only lands as defined in section 3(5) can be made liable for assessment;
- ◆ if the total estimated cost, excepting the cost of crossing a public utility or roadway, exceeds the set limit, and the proposed work therefore cannot be constructed under section 3, and if no petition has been submitted to proceed under section 4, the engineer shall determine, as outlined in section 40, by whom the expenses incurred so far shall be paid.



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