CITY OF LETHBRIDGE

INFRASTRUCTURE SERVICES DEPT.

CONSULTING ENGINEER'S LAND DEVELOPMENT FIELD SERVICES GUIDELINES

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CONSULTING ENGINEER'S LAND DEVELOPMENT FIELD SERVICES GUIDELINES

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PART ONE - GENERAL

1.0 PREAMBLE AND OBJECTIVES

The objectives of the stakeholders involved in land development in the City of Lethbridge have traditionally been to produce a safe, healthy, attractive and economically viable development that meets the standards and specifications of the City of Lethbridge within a reasonable time frame. This document outlines what the City of Lethbridge City Engineer expects of the Developer's Consulting Engineer during the construction of new land development projects.

The standard Service Agreement contains a clause that refers to the Consulting Engineer's Land Development Field Services Guidelines. The objective of this document, the Consulting Engineer's Land Development Field Services Guidelines is to detail the minimum level of Field Services to be provided by a Consulting Engineer to the Developer relating to the construction, installation and inspection of infrastructure built in a new development under all standard Service Agreements executed between the City and the Developer.

As detailed in the Service Agreement, the Developer is and shall remain ultimately responsible to the City for full and proper performance of all obligations and Work until the issuance of the last FAC.

1.1 INTENT OF THESE FIELD SERVICES GUIDELINES

Field Services are to be provided by the Consulting Engineer to such a level and extent as to make the Consulting Engineer completely familiar with the workmanship and the materials supplied and installed by the Contractor. The intent of this document is to provide consulting engineers working on land development projects in the City of Lethbridge clear expectations that the City Engineer has of Developer's Consulting Engineers.

1.2 EXPECTATIONS OF THE CITY ENGINEER

The Consulting Engineer must also be able to verify that the Work conforms in all respects with the City approved construction designs and specifications for the purpose of CCC certification. This may require full time inspection as defined in Section 3 of these guidelines. The Consulting Engineer is required to have suitably qualified inspectors to confirm that the intent of the designs and specifications are achieved. The Consultant is being relied upon to provide a professional level of inspection services culminated with the certification statement in the CCC. The certification statement in the CCC reads as follows:

"I _____ OF THE FIRM _____
"CONSULTING ENGINEER", HEREBY CERTIFY THAT THE MUNICIPAL IMPROVEMENT WORK NOTED HEREIN IS COMPLETE AS DEFINED BY THE SERVICE AGREEMENT MENTIONED ABOVE AND CONSTRUCTED, INSTALLED AND INSPECTED, AS FAR AS CAN BE PRACTICALLY ASCERTAINED ACCORDING TO THE CITY OF LETHBRIDGE SERVICING STANDARDS IN COMPLIANCE WITH THE REQUIREMENTS OF THE SERVICE AGREEMENT. I HEREBY RECOMMEND THIS MUNICIPAL IMPROVEMENT FOR APPROVAL FOR A CONSTRUCTION COMPLETION CERTIFICATE."

Soil compaction, material compliance and other testing services are for the protection of the Developer in the performance of his obligations to the City. The responsibility for recommending testing frequency therefore rests with the Developer's Consulting Engineer. The Developer is and shall remain responsible to the City for full and proper performance of all obligations and Work under the Service Agreement.

It is recognized that the Developer may elect to hire a specialist such as a Landscape Architect to oversee the landscaping. The possible division of responsibilities for CCC certification purposes is to be addressed in the Service Agreement and for the purpose of these Guidelines, is assumed to be delegated to the Prime Consultant.

The Consulting Engineer shall provide and keep up-to-date all documentation as per Part 4 of these Guidelines. The Consulting Engineer shall issue to the City Engineer all documents and records in a timely fashion as requested by the City Engineer.

Where unusual or complicated construction situations arise, sound engineering judgment should prevail. Questions specific to the requirements in this document may be directed to the City Engineer.

1.3 DEFINITIONS

a) "City" means the City of Lethbridge, a municipal corporation in the Province of Alberta.

b) "City Engineer" means the City of Lethbridge Director of Infrastructure or duly delegated City representative.

c) "Construction Completion Certificate" or "CCC'" is a document found in the Service Agreement. It is to be signed and sealed by the Consulting Engineer upon the completion of the Work by the Developer and submitted to the City for approval.

d) "Consulting Engineer" (referred to as the Engineer of Record in the Service Agreement)is a Professional Engineer, and his duly accredited representatives, hired by the Developer and who is a member in good standing of the Association of Professional Engineers, Geologists and Geophysicists of Alberta. The Consulting Engineer is responsible to the Developer for the design and inspection of the construction and installation of all of the Work to be carried out under a Service Agreement by or at the expense of the Developer. The Consulting Engineer is usually deemed to be an agent of the Developer for the

purposes of the Service Agreement and the Consulting Engineer shall, in accordance with these Guidelines, certify that all materials supplied and the construction, installation and inspection of all Work conforms in all respects to the City's current approved construction specifications and design standards, and according to acceptable engineering practice. Should the Developer choose to employ numerous consultants on a single project, the Consulting Engineer is the engineer who has signed Schedule F in the Service Agreement.

e) "Contractor" is the Contractor, hired by the Developer to supply, construct and/or install the Work covered by a Service Agreement at the expense of the Developer. The Contractor shall carry out the construction and installation of the infrastructure required for a new development in accordance with the City's approved engineering drawings, construction specifications and acceptable engineering practices.

f) "Developer" is the individual and/or corporation who proposes to install and construct the Work as outlined in the Service Agreement. The Developer, by employing a Consulting Engineer, shall confirm that all materials supplied and the construction, installation and inspection of all of the Work conforms in all respects to the City approved construction designs and specifications, or as otherwise required by the City Engineer.

g) "Field Services" are the on-site inspection, supervision and record keeping services provided by the Consulting Engineer to the Developer relating to the construction, installation and inspection of the Work as outlined in the Service Agreement. The minimum level of Field Services provided to the Developer by the Consulting Engineer is defined in these guidelines.

h) "Final Acceptance Certificate" or "FAC" is a document found in the Service Agreement. It is to be signed and sealed by the Consulting Engineer at the end of warranty period for the respective infrastructure. These documents will be approved and issued to the Developer or his agent upon the final acceptance of the Work, or portions thereof as set forth in the Service Agreement, by the City Engineer (see Schedule D).

i) "Guidelines" is the document entitled Consulting Engineer's Land Development Field Services Guidelines. The Guidelines specify the level of field services to be provided by the Developer's Consulting Engineer during the construction, installation and inspection of the Work outlined in a Service Agreement.

j) "Service Agreement" is the executed agreement and all related published documentation between the Developer and the City that details the terms and conditions under which the Developer is to construct or install the Work. Published documentation refers to items such as approved drawings, letters, memos, and site meeting minutes.

k) "Work" means the stripping and grading of the site, the installation and construction of utilities, the construction of surface improvements, parks development, landscaping, and other such services as identified in the Service Agreement and all published related documentation (i.e. approved drawings, letters, memos, and site meeting minutes)

1.4 CONTRACTUAL RELATIONSHIPS

1.4.1 CITY / DEVELOPER

The Service Agreement defines the relationship between the City of Lethbridge and the Developer.

The Developer, in accordance with the Service Agreement, commits to the City to complete the construction of a phase of development to the current engineering standards and to the satisfaction of the City Engineer. In order to achieve this, the City standard Service Agreement requires that the Developer employ a Consulting Engineer.

The Developer is and shall remain responsible to the City for the full and proper performance of all the obligations and work under the Service Agreement until the FAC has been executed by the City Engineer or an appointed representative.

1.4.2 DEVELOPER / CONSULTING ENGINEER

The relationship between the Developer and the Consulting Engineer is defined by a private contract or agreement. The Developer's Consulting Engineer signs Schedule F in the Service Agreement certifying that they are the responsible engineer on record for that phase of development.

The Consultant is retained by the Developer to prepare design drawings and specifications based upon the particular location, ground form, site conditions, and information pertaining to the subdivision to be constructed. The Consulting Engineer is professionally responsible to the Developer for the engineering design of the subdivision.

The Consulting Engineer's contract with the Developer shall be defined such that the Consulting Engineer shall be obligated to provide the expected level of Field Services as specified in these Guidelines. The Consulting Engineer is responsible to the Developer to monitor the Contractor(s) construction and installation of the Work.). The Consulting Engineer shall certify that all materials supplied and the construction, installation, and inspection of all Work conforms in all respects to the City approved construction designs and specifications, or as otherwise required by the City Engineer.

Subsequent to the completion of the Work, the Consulting Engineer, shall continue to be responsible to the Developer for the Field Services and shall inspect the Contractor(s) maintenance activities and repair of deficiencies up to the issuance of the last FAC, in order to certify that the maintenance activities and repair of deficiencies are in compliance with the City approved construction designs and specifications, or as otherwise required by the City Engineer.

1.4.3 DEVELOPER / CONTRACTOR

The relationship between the Developer and the Contractor is defined by a private contract or agreement.

The Developer shall draft his contract or agreement with the Contractor based upon the City approved engineering drawings and construction specifications. Generally the Contractor is held responsible by the Developer for the quality of his work. Notwithstanding the above the Developer is ultimately responsible to the City for the performance of all obligations, terms and conditions specified in the Service Agreement.

1.4.4 CONSULTING ENGINEER / CITY ENGINEER

There is not a defined relationship between the City Engineer and the Consulting Engineer. It is widely accepted, however, that a good working relationship between the City and the consultant helps to create a team-like atmosphere rather than a regulatory environment. Both the City and the Consultant shall strive to maintain an amicable relationship so that any issues that may come up during construction can be addressed quickly and easily.

1.4.5 CITY ENGINEER / CONTRACTOR

The relationship between the City Engineer and the Contractor is informal. Any communication from the City Engineer regarding the ongoing Work shall be communicated directly to the Consulting Engineer.

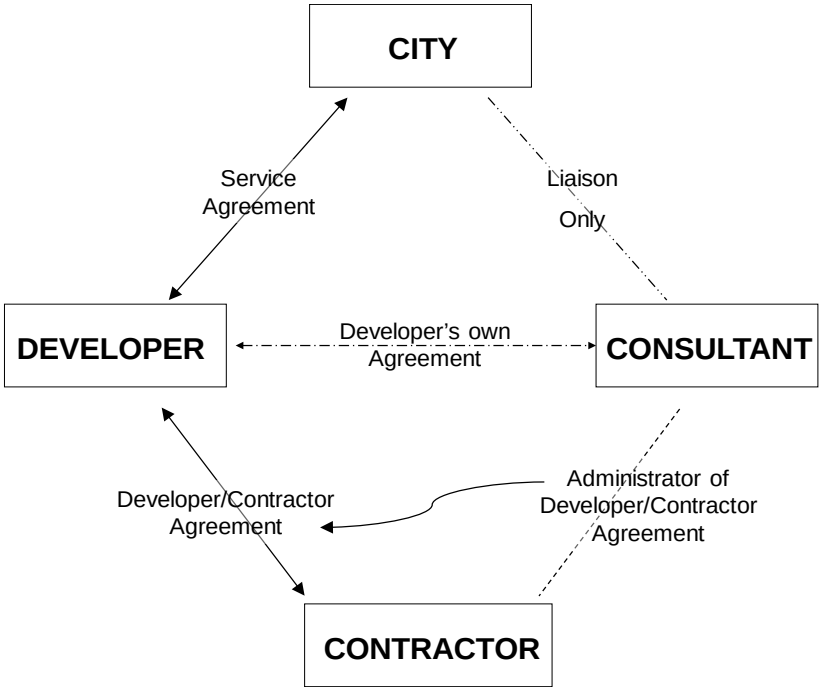

FIGURE 1.4.6
DIAGRAM OF CONTRACTUAL RELATIONSHIPS

PART 2 - QUALIFICATIONS OF CONSULTING ENGINEERS' FIELD INSPECTORS

2.0 GENERAL

In order to perform the inspection, supervision and record keeping obligations, the Consulting Engineer shall retain resident site inspectors. The Consulting Engineer is required to have suitably qualified inspectors to verify that the intent of the designs and specifications are achieved.

The inspector's dealings in matters pertaining to the on-site work will be, in general, only with the Consulting Engineer, the City Engineer and the Contractor. The inspector shall be available to answer any questions pertaining to the Work that the City Engineer may have.

The inspector's dealings with subcontractors will only be through or with the full knowledge of the Contractor or the Contractor's superintendent. The inspector shall generally communicate with the Owner only through or as directed by the Consulting Engineer.

2.1 INSPECTOR'S QUALIFICATIONS

The Consulting Engineer is responsible for ensuring that the Field Inspector is qualified to inspect municipal civil works.

PART THREE - TYPICAL SITE INSPECTION DUTIES

3.0 GENERAL

- The Consulting Engineer, prior to commencement of construction, shall be completely familiar with 'The Consulting Engineer's Land Development Field Services Guidelines'.
- The City approved construction specifications, standards, procedures, and design guidelines.
- The approved engineering plans of the specific Work.
- The Service Agreement and the conditions of Tentative Plan approval for the subdivision.
- The proposed work schedule of the Contractor(s) and the equipment to be used.

The Consulting Engineer shall notify the City Engineer when and where all work, construction and maintenance, on underground utilities, overland drainage facilities, parks, and other surface improvements are to be performed and shall advise the City Engineer of any changes to the approved detailed design.

Prior to any work beginning on construction of the respective utilities and surface improvements for which approved drawings and permission to construct has been granted in writing, the Consulting Engineer shall invite the City Engineer to a pre-construction meeting.

The Consulting Engineer shall ensure that suitable mitigative measures are exercised to control erosion and sediment deposition and provide dust control during all construction activities (refer to City standard Service Agreement).

3.1 SITE MEETINGS

Prior to construction commencing, the Consulting Engineer shall organize and chair a preconstruction site meeting with the Contractor(s) and the City Engineer. This meeting shall address coordination items and safety issues as applicable. The Consulting Engineer shall schedule regular site meetings with the Contractor and the City Engineer as the Work is in progress for the purpose of addressing ongoing coordination items as applicable and shall maintain recorded minutes of these meetings as warranted.

3.2 STRIPPING AND GRADING ACTIVITIES

Where stripping and grading abuts an environmental reserve, the method of erosion control protection is to be reviewed with the City Engineer. The Consulting Engineer shall inspect the stripping and grading operation to verify that the City's specifications and approved designs are complied with.

Compaction testing and quality control during the site grading shall be sufficient for the Consulting Engineer to certify that the stripping, grading, backfilling and compaction for all road right-of-way, private and public lands are in compliance with the City of Lethbridge Construction Specification Section 06000 – 'Backfill Regulations for Public Right-of-Ways'.

3.3 UNDERGROUND UTILITIES (Watermains, Valves, Hydrants, Sanitary Sewers, Storm Sewers, Manholes, Sewer and Water Service Connections, Sewage Lift Stations, Stormwater Management Facilities, and Catch Basin Leads)

3.3.1 GENERAL

The Consulting Engineer is being relied upon to provide a professional level of inspection services culminated with the certification statement in the CCC.

This section outlines the inspections which are expected of the Consulting Engineer.

3.3.2 INSPECTIONS REQUIRED

The Consulting Engineer is required to inspect the following before the Contractor buries or compacts over the Work:

- Excavation of existing utility crossings
- Connections to the existing system and installation of mainline fittings and manholes
- Mainline pipe installation
- Installation of valves and hydrants
- All service connections to the main and installation of curb stands at the property or easement line
- Backfill compaction compliance monitoring shall be carried out as outlined in City of Lethbridge Construction Specification Section 06000 – 'Backfill Regulations for Public Right-of-Ways'.

The extent of inspection by the Consulting Engineer during the following work may be determined by the Consulting Engineer. Periodic inspections may be considered adequate for the following underground utility construction:

- Backfilling above the pipe zone and around vertical risers; manholes, valve casings, hydrants, and curb stands (materials testing will be in progress during backfilling)
- Shallow utilities duct sleeve roadway crossings

Following underground utility construction the Consulting Engineer shall organize and review the following:

- Water pressure testing. This is to be completed in the presence of the City Engineer and the Consulting Engineer. A minimum of 48 hour's notice is required, excepting weekends and holidays, to be given prior to when the water pressure testing procedures will be carried out. Testing procedures must follow the most current AWWA Standard C605.Waterline disinfection. This is to be completed in accordance with the most current AWWA StandardC651. Once all testing is complete the Consulting Engineer will submit a copy of the test results, along with a letter confirming all AWWA standards have been followed, to the City Engineer. The new water distribution system will not be opened up to the existing distribution system until the City Engineer is satisfied that all of the waterlines have been adequately disinfected and acceptable bacteriological

analysis results have been confirmed. Please see the attached flow chart for the entire process.

- CCC and FAC inspections and re-inspection after correction of deficiencies.
  - It is expected that the Contractor and the Consultant complete an inspection of the Work prior to organizing an inspection with the City Engineer
  - All deficiencies shall be rectified as much as possible prior to a CCC or FAC inspection
  - All information listed in Section 4.4 has been submitted to the City
  - All deficiencies must be rectified 60 days after the inspection unless another date is agreed to at the time of inspection
  - After the 60 days has passed all work, not just the deficiencies, will be re-inspected.

The Consulting Engineer shall conduct the necessary inspections for CCC certification that the materials supplied and the construction installation/workmanship conform in all respects with the City approved designs and specifications (see also Section 4 Documentation).

3.3.4 MATERIALS COMPLIANCE TESTING

On-site and off-site material compliance testing as outlined in the City of Lethbridge Construction Specifications shall be conducted by an accredited geotechnical testing company. All materials supplied and installed shall comply in all respects to the current City standards and specifications.

The Consulting Engineer shall obtain certified results of tests conducted by each material manufacturer if required by the City Engineer. The testing reports as identified in the specifications shall be forwarded by the Consulting Engineer to the City Engineer if the pipe materials delivered to the site are not appropriately stamped with the manufacturer's certification that the material meets all of the required standard specification certifications (CSA, ASTM, etc.).

Watermain appurtenances and pre-cast manholes should be visually inspected prior to installation. Flaws or defects on the materials should be made known to the Contractor in writing in order that acceptable materials can be brought to the site to be installed.

Compaction compliance testing of backfill materials shall be conducted by an accredited geotechnical testing firm in accordance with the City of Lethbridge Construction Specification Section 06000 – 'Backfill Regulations for Public Right-of-Ways'

3.4 SURFACE IMPROVEMENTS :

(Curbs, Gutters, Sidewalks, Catch Basins, Graveled Lanes, Paved Lanes, Paved Roads, Paved Walkways, Sound Attenuation Fencing, and Overland Drainage Control Features)

3.4.1 GENERAL

The Consulting Engineer is being relied upon to provide a professional level of inspection services culminated with the certification statement in the CCC.

This section outlines inspections which are expected of the Consulting Engineer.

3.4.2 INSPECTIONS REQUIRED

The Consulting Engineer will be required to inspect the following before the Contractor is allowed to proceed:

- Proof-roll of the subgrade and granular base construction. This is to be completed with the Contractor, the Consulting Engineer, and the City Engineer present; (City Engineer to be notified minimum 48 hours, excepting weekends and holidays, prior to when the proof-roll procedures are carried out)
- Inspection of the string line to check consistency with design for all extruded concrete placement
- Inspection of forms to check consistency with design for all hand formed concrete

Periodic inspections may be considered adequate for the following Surface Improvement construction:

- Over-excavation of the subgrade
- Sidewalk subgrade placement
- Asphalt concrete placement (after proof-roll of granular base)
- Backfilling behind concrete curbs and sidewalks

Following surface construction, the Consulting Engineer shall organize and review the following:

- CCC and FAC inspections and re-inspection after correction of deficiencies
    - It is expected that the Contractor and the Consultant complete an inspection of the Work prior to organizing an inspection with the City Engineer
    - All deficiencies shall be rectified as much as possible prior to a CCC or FAC inspection
    - All information listed in Section 4.4 has been submitted to the City
    - All deficiencies must be rectified within 60 days after the inspection unless another date is agreed to at the time of inspection
    - After the 60 days has passed all work, not just the deficiencies, will be re-inspected.
- The Contractor is required to provide advanced notice to any homeowners affected by deficiency repairs.

3.4.3 MATERIALS COMPLIANCE TESTING

On-site and off-site material compliance testing as outlined in the City of Lethbridge Construction Specifications shall be conducted by an accredited geotechnical testing

firm. All materials supplied and installed shall comply in all respects to the City Engineering Standards.

The Consulting Engineer shall check the subgrade, base and sub-base where applicable and arrange for soil density tests to confirm adherence to City of Lethbridge Construction Specification Section 06000. Inspection and quality control reports for roads, lanes, and walkways shall consist of compaction certificates and asphalt pavement core logs for density and thickness determination.

Compaction compliance testing of backfill and pavement structure materials shall be conducted by an accredited geotechnical testing firm as per Section 4.5.

All compliance testing reports must be accompanied by:

- A letter confirming that the Geotechnical Engineer has reviewed the material
- A letter from the Consulting Engineer stating that he has reviewed the material and taken the appropriate action

3.5 PARKS: LANDSCAPING AND IRRIGATION

3.5.1 GENERAL

The Consulting Engineer is being relied upon to provide a professional level of inspection services culminated with the certification statement in the CCC

This section outlines the inspections which are expected of the Consulting Engineer.

3.5.2 INSPECTIONS REQUIRED

The Consulting Engineer will be required to inspect the following:

- Subgrade
- Backfilling
- Finish grading
- Topsoil quality
- Playground installation
- Plant material
- Tree and shrub planting
- All irrigation mainline
- All valves, joints, and fittings including valve boxes and access boxes
- Test and Certification of double check valve assembly
- Pressure testing of irrigation system
- Electrical inspection and certification of irrigation facilities
- Existing utility crossings
- All wiring splices
- All connections to existing systems

Although full time inspection may not be required in the opinion of the Consulting Engineer, the Consulting Engineer shall conduct the necessary inspections for CCC certification that the materials supplied and the construction installation/workmanship conform in all respects with the City approved designs and specifications (see also Section 4 Documentation).

3.6 EROSION CONTROL MEASURES

Erosion control measures shall be applied to the site to control wind and water erosion so that it does not become a nuisance, a danger, cause damage to property or cause unnecessary harm to the environment. Erosion control measures shall be in place prior to any Work commencing on the project site and removed only after adequate plant growth has been established to prevent erosion.

3.6.1 EROSION CONTROL PLAN

The Developer is required to submit an erosion control plan designed by an experienced designer for review by the City Engineer before a letter of permission to construct will be issued.

The erosion control plan shall include the following:

1. A description of the area's pre-stripping state and erosion resistance.
2. A description of the area's susceptibility to erosion, including its exposure to prevailing winds and a description of soil types.
3. An evaluation of the potential impacts of allowing erosion, i.e. are there risks to property, health, safety or the environment?
4. Expected length of time and estimated date before home construction or the re-establishment of vegetation mitigates erosion potential.
5. A description of proposed erosion prevention measures.
6. A map showing the areas to be stripped and the location, type, and phasing, of erosion protection measures.

The Developer is required to carry out the plan as approved by the City. Before the Construction Completion Certificate for Surface Works will be issued, a letter must be submitted, signed by the Developer's Engineer, certifying that the plan has been carried out.

Due diligence must be demonstrated in order to limit the extent and magnitude of erosion. This means that erosion control efforts used at other comparable sites in Alberta and Canada will be used by the courts to determine if the proper amount of diligence has been demonstrated.

3.6.2 PLAN DURATION AND LEVEL OF SERVICE

The City of Lethbridge experiences frequent high wind events and is located in a semi-arid region. The emphasis of the erosion control measures should be on the control of wind erosion and blowing dust. The components of the plan should be appropriate to the probability of erosion occurring and risks involved.

The erosion control plan will cover the entire construction period. This includes periods during which there is no active construction happening but an area has been stripped and is exposed to wind or water erosion as well as periods after construction during which erosion resistant vegetation is being established.
Interim erosion control measures, covering the period from start of construction to the establishment of permanent erosion protection measures, will be designed to adequately resist a 1:25 year wind event and a 1:25 year rainfall event.

If an area is to be left exposed and is not being actively worked on for an extended period (more than 30 days) and especially during the winter, October 1 to March 1, erosion prevention measures must be established which equal or exceed the erosion resistance of the site prior to stripping.

3.6.3 PLAN REVIEW BASIS

The erosion control plan and the effort required to prevent erosion will be evaluated based on the following criteria.

1. *Potential Impacts of Erosion*. Will blowing dirt or water borne sediment impact farmland, developed residential areas, or the environment. How serious are the impacts.
2. *Past Experience*. Have adverse impacts resulting from erosion been experienced in adjacent areas?
3. *Period During Which Erosion May Occur*. Will the area be left exposed over the winter period or will there be time for a vegetative cover to be established?
4. *Extent and Type of Erosion Protection Measures*. Are the proposed measures appropriate considering the potential adverse impacts and the probability that they will occur.

3.6.4 SOME EROSION MANAGEMENT PRACTICES

The following elements form an effective Erosion Control Plan (ECP):

1. Minimize needless clearing and grading
2. Schedule construction to limit soil exposure during critical periods, fall and winter
3. Sprinkle the site with water to control dust during construction.
4. Roughen cleared areas
5. Stabilize exposed soils using hydro-seeding, mulch, or tackifier as soon as practical after disturbance
6. Construct wind breaks and fences
7. Minimize and limit access by traffic to stabilized areas
8. Protect Steep Slopes, Cuts and Drainage Ways.
9. Boundary Filters and Sedimentation to Keep Sediment Onsite
10. Limit the tracking of mud and sediment onto finished streets by building and maintaining haul and access roads and gravel pads at transitions from the site to roads.

11. Verify that contractors are familiar the ECP, implementation, inspection, maintenance and repairs
12. Adjust ECP for site specific conditions
13. Assess ECP practices after wind and storm events.

If Catch Basin Sumps are being used as a primary means of controlling sediment in runoff during construction, arrangements must be made to clean the sumps before a construction completion certificate will be issued. Mechanisms to promote settling of runoff and prevent the tracking of sediment onto streets by construction vehicles should be instituted to limit sediment entering the storm water conveyance system.

3.6.5 USEFUL EROSION CONTROL REFERENCES

The following list of references provides useful additional information on erosion control:

1) Guidelines For Erosion & Sediment Control, The City of Calgary Wastewater & Drainage Urban Development, 2011, http://www.calgary.ca/PDA/DBA/Documents/urban_development/publications/ESC-guidelines-2011.pdf
2) Stormwater Management Design Manual, City of Calgary Wastewater & Drainage Urban Development, 2011, http://www.calgary.ca/PDA/DBA/Documents/urban_development/bulletins/2011-stormwater-management-and-Design.pdf
3) An Introduction to Wind Erosion Control, Alberta Agriculture, http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex3524
4) Control of Soil Erosion, Ontario Ministry of Agriculture, http://www.omafra.gov.on.ca/english/engineer/facts/12-053.htm

PART FOUR - DOCUMENTATION

4.1 GENERAL

All documentation provided to the City Engineer shall completed in a legible and professional manner.

4.2 DURING THE WORK

The Consulting Engineer shall supply the following documentation to the City Engineer in a timely manner:

- Two hard copies of the final approved construction drawings and one digital copy (.dwg format). These should be distributed at the pre-construction meeting.
- Minutes of the pre-construction site meeting
- Minutes of the site meetings
- Copies of field orders as requested

Any deficiencies observed by the City Engineer during the construction are to be brought to the attention the Consulting Engineer as they are observed, in writing, as soon as possible. The Consulting Engineer will notify the City Engineer with a minimum of 48 hours notice, excepting weekends and holidays, when and how the deficiency is to be corrected.

4.3 AFTER THE WORK IS COMPLETED, PRIOR TO ISSUANCE OF THE CCC

The Consulting Engineer shall document all testing that is carried out during construction. The City Engineer shall be present for all testing completed in accordance to Section 3.3.2 of these Guidelines.

The Consulting Engineer shall inspect the Work with the Contractor, record any deficiencies and advise the Contractor to repair any deficiencies. After the Contractor repairs the deficiencies, the Consulting Engineer shall arrange for an inspection with the City Engineer. Prior to forwarding any CCC's to the City Engineer all related outstanding field orders are to be resolved and any omissions to be approved by the City Engineer.

4.4 ACTIVITY SUBSEQUENT TO ISSUANCE OF CCC'S

During the warranty period the Consulting Engineer is responsible for the following:

- At least 30 days prior to the expiration of the Underground utility warranty period, the Consulting Engineer shall prepare and submit an as-built package based upon field survey and field notes:
  - .pdf and .dwg record drawings
  - Base line work including lot services line work .dwg
  - Valve, Hydrant and Service attribute information .xls spreadsheet (see attached example).

- A sewer televising video inspection is required prior to the end of the warranty period as stated in the applicable Service Agreement. This video shall be reviewed for deficiencies and all deficiencies are to be corrected prior to the expiration of the warranty period. The Consulting Engineer will review the video and provide the City with a letter noting that they have reviewed the video and that all deficiencies have been corrected.
- Conduct periodic checks of the subdivision during the warranty period and note any failures, settlements, or other deficiencies in the Work as well as respond to any "complaint" calls forwarded by the City to the Consulting Engineer.
- A compaction and materials testing report complete with a letter of compliance from the Consulting Engineer.
- Have all catch basins completely cleaned out before the Underground FAC inspection.
- Prior to submission of the FAC, the Consulting Engineer shall inspect the Work referred to in the FAC, record any deficiencies and advise the Contractor to repair any deficiencies. After the deficiencies are repaired, the Consulting Engineer shall request an inspection of the Work with the City Engineer. If further deficiencies are noted, a list of the deficiencies shall be prepared by the Consulting Engineer. When the deficiencies have been corrected, the Consulting Engineer shall then, within 60 days from original inspection (unless an alternate date is agreed to at the initial inspection), request from the City Engineer, a re-inspection for only the noted deficient items.
- Until the record drawings have been submitted and incorporated into the City of Lethbridge corporate system, the Consulting Engineer is responsible to provide locates within the development for any requests that are made through Alberta One-Call.

4.5 MATERIALS COMPLIANCE LETTER

The Consulting Engineer shall provide confirmation in the form of a summary letter that all underground utility trenches have been backfilled and compacted and comply in all respects to the City Engineering Standards. If there are instances where work does not meet or exceed the construction specifications, the Consultant shall provide, in a letter, a recommendation to the City Engineer as to how the deficiency should be handled considering the penalties that are defined in the specifications. If concrete or asphalt or portions thereof fail to meet the minimum standards as outlined in the City of Lethbridge construction specifications a payment reduction may be applied. The Consulting Engineer is responsible to calculate the amount of money that is owed to the City as a result of a deficiency. In some instances, at the City Engineer's discretion, an extended maintenance bond may be acceptable due to a deficiency in concrete strength. In extreme cases, the work may have to be replaced as per city specifications.

CONSULTING ENGINEER'S LAND DEVELOPMENT FIELD SERVICES GUIDELINES

PART FIVE - APPEAL PROCEDURES

GENERAL

When, in the opinion of the City Engineer, any materials, design, construction, installation or inspection of the Work does not conform to the City standards and specifications, the City Engineer shall issue to the Consulting Engineer, a field order. This field order is to detail the deficiency as well as the corrective action to be taken.

If the Consulting Engineer directs or causes the Contractor to correct the deficiency as required by the City Engineer in the Field Order, the Consulting Engineer shall notify the City Engineer prior to commencing the corrective action. The Consulting Engineer shall return one copy of the completed Field Order to the City Engineer with a written confirmation of the corrective action that was taken.

If the Consulting Engineer does not take the corrective action as and when required in the Field Order, the City Engineer may immediately stop any work, as provided for in the applicable Service Agreement. In addition, if in the opinion of the City Engineer, unsatisfactory materials have been or will be utilized, the City Engineer may order the removal of the unsatisfactory material from the area.

In accordance with the established procedures endorsed by the City Engineer, the Developer, (or the Consulting Engineer on behalf of the Developer), may appeal the City Engineer's decision to the next level of supervision until the City Manager is reached. Any decision taken by the City Manager on a matter related to land development will be considered final and binding.