



6.0

Plan of Subdivision

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6.0 Plan of Subdivision

6.1 Introduction

A Plan of Subdivision application initiates the process of subdividing property into multiple lots or blocks for individual sale. Subdivision development is an extensive process that involves significant planning and engineering input to prepare the required background information, and it generally extends over a period of several years. Each project will involve site specific criteria and challenges that must be addressed on an individual basis. Significant consultation with City staff will be required throughout the development process.

The following information is intended to address common questions related to subdivision development. A comprehensive review of all aspects of subdividing land is beyond the scope of this document. Additional background information on the development process can be obtained from the Ontario Ministry of Municipal Affairs and Housing website - www.mah.gov.on.ca/Page338.aspx.

6.2 Applicable Legislation & Guidelines

In general, subdivision development is governed by the Planning Act. Development in Waterloo is subject to various documents prepared under the authority of this act, including The Provincial Policy Statement on Land Use Planning, and the Regional and City Official Plans. Specific aspects of subdividing land are subject to numerous acts, regulations, guidelines and specifications, and it is the Developer's responsibility to ensure that all works are completed in accordance with applicable law.

6.3 Subdivision Development Process

6.3.1 Draft Plan

A preliminary layout or draft plan of the proposed subdivision is initially prepared by a planning consultant. A legal survey of the original property is completed, and then proposed lots, blocks, and municipal street layouts are prepared. The layout must include park blocks, stormwater management areas, and land usage in accordance with all applicable provincial and municipal policies. A Draft Plan of Subdivision application based on the proposed layout is prepared and submitted to the Region and the City simultaneously. The application is reviewed to confirm the following:

- Conformity with the Official Plan
- Compatibility with adjacent land uses
- Compliance with zoning by-laws
- Suitability for the proposed purpose
- Provision of adequate services including access, water supply and sewage disposal
- Protection from potential flooding

After consideration of the complete draft plan application, the development may be either refused or draft approved. Draft approval allows the applicant, in conjunction with the approval authorities, to establish conditions of development and to proceed with detailed engineering review. Consultation with outside agencies and other interested parties is required and includes, but is not limited to the following:

- Region of Waterloo
- City of Waterloo
- Grand River Conservation Authority
- Ministry of the Environment
- Ministry of Natural Resources
- Hydro One
- Waterloo North Hydro
- Union Gas
- Canada Post

- Bell Telephone
- Rogers Cable
- Grand River Transit

6.3.2 Subdivision Agreement

The subdivision agreement is a detailed contract between the Developer and the City that stipulates all conditions of development. The agreement specifies all the subdivision requirements including planning, engineering, landscaping and utility information. It specifies applicable fees, charges, and securities to be provided by the developer, and it indicates land dedication requirements for municipal rights-of-way, parks, easements, and trail systems. Timing and staging of development details are also contained in the agreement.

A detailed cost estimate of all servicing, stormwater management, landscaping, road and surface works required for the development is included in the agreement. This estimate is prepared by the Engineer and is attached as Schedule 'B' to the subdivision agreement (see appendix C). It forms the basis of all fee and security requirements for the development and indicates any items that are the financial responsibility of the City.

The subdivision agreement must be executed by all parties prior to construction of any site works. Before the agreement can be released to the developer for execution, the following information must be submitted to and accepted by the City:

- A list of all conditions of draft approval and written confirmation of how each condition has been or will be addressed
- Financial requirements for existing and future works to be completed by others and described in an approved cost sharing agreement
- Parkland dedication details including area calculations
- The engineering review fee paid in full, as per the City's Fee By-law
- Securities posted for all required works
- Proof of Contractor's Liability Insurance, in the amount of \$5,000,000 naming the City co-insured

6.3.3 Registration

When all conditions of draft approval have been addressed, final approval is granted. The plan of subdivision may then be registered in the provincial land titles registry system. Individual lots in the subdivision may not be sold until registration of the plan of subdivision is complete. Immediately after registration, the developer must provide mylar and digital copies of the registered plan to the City.

6.4 Financial Requirements

Subdivision development requires payment of several planning and engineering related fees throughout the duration of the process. Additionally, securities for the proposed work are also required. A complete, updated list of applicable fees and charges associated with development is included in the annual update of the City Fee Guide in accordance with the Fees and Charges By-law, as approved by Waterloo City Council. Possible fees and charges that may be required for subdivision development may include, but are not limited to:

6.4.1 Subdivision Development Fees

- Official Plan Amendment
- Draft Plan of Subdivision
- Draft Plan of Condominium
- Zoning By-law Amendment
- Environmental Site Assessment Review
- Engineering Review Fee
- Development Charges
- Site Alteration Permit Fee

6.4.2 Engineering Review Fees

The engineering review fee for a subdivision application is 5% of the capital cost of the municipal infrastructure associated with the development, including costs for any items that will be paid for by the City. The fee is based on

the pre-tender estimate for the work that is included in the Subdivision Agreement, excluding contingencies and tax. Unit rates are to be based on three year average costs or as approved by the Director. City fees are subject to change and are based on the City's annual fee guide as approved by Council.

The review fee shall be paid in two stages as follows:

- **Stage 1 Fee** – upon receipt of the First Submission engineering drawings, the Financial Services Department will issue an invoice to the Developer calculated at 2% of the estimated value of the work. Payment is due on receipt and delay of this payment may result in withholding the release of comments or further processing of engineering submissions;
- **Stage 2 Fee** – the balance of the Engineering Fee (5% less the amount paid with the First Submission) will be invoiced at the time the Engineering drawings are accepted. At this time, the cost estimate should be updated to reflect significant changes to unit prices, actual tender prices, if available or any changes in the scope of work.

When the total engineering fee has been paid, no further fee adjustments will be made, regardless of the received tender values. Actual tendered prices will be used to calculate the required performance securities for the works.

6.4.3 Land Dedication Requirements

Subdivision development requires the dedication of some lands to the municipality. Land dedication will be required for municipal roadways, stormwater management facilities, parkland, trail systems, and emergency access as well as easements for utilities and services.

6.4.4 City Share of Municipal Servicing Costs

The City of Waterloo may contribute funding to growth related capital projects and oversizing of infrastructure internal to a plan of subdivision in accordance with the City's current Development Charge Background Study and associated by-law. City contributions to a project may occur for future growth in the area, or if a benefit to existing lands may be realized. For capital projects, City share funding is typically from two sources:

1. The development charge reserve comprised of fees collected from new development to pay for the 'growth' component, and,
2. The capital reserve fund comprised of revenue from the general tax levy and water and sewer rates to cover the benefit to existing component or any assessable City owned lands abutting the works.

City contributions to any development related project requires Council approval. Council approval is normally acquired during the annual Capital Budget process prior to the anticipated time of development of any particular plan of subdivision as identified in the City of Waterloo Staging of Development Report. If the plan is to proceed in advance of Capital Budget approval, then the Developer will have the option to wait for approval or enter into a front-ending agreement with the City whereby the Developer finances the construction of the works until such a time that the City has an approved source of funding. Front-ending agreements are subject to the statutory requirements of the Province (e.g. Development Charges Act, Municipal Act).

The City's funds for a project are to be paid out based on actual prices approved by the Engineering Services Division to an upset limit established in the Development Charge Background Study and Capital Budget.

When City funding is included in a project, the Developer's consultant must issue a Public Tender in accordance with City of Waterloo Purchasing By-law.

6.5 Design Requirements

The developer is required to retain a licensed Professional Engineer to undertake the design and certification of all municipal servicing and surface works items as outlined in the Schedule 'B' to the subdivision agreement.

6.5.1 Design Guidelines and Specifications

The following sections outline some general standards and administrative requirements, related to subdivision development in the City of Waterloo. Professional design staff must be familiar with applicable standards, specifications, guidelines, legislation, best practices and municipal policies relating to the proposed works. The

Engineer providing design services for the site servicing works is responsible for understanding and incorporating all relevant requirements based on current legislation and guidelines as applicable to the planning, design, and construction of all services in Ontario. Additional design criteria are included in Section 6.0; however, this manual is not intended to be a complete reference for all aspects of design.

The following list references key documents that pertain to design related to subdivision development:

- MOE Design Guidelines for Drinking Water Systems
- MOE Design Guidelines for Sewage Works
- MOE Stormwater Management Planning and Design Manual
- MOE Watermain Design Criteria for Future Alterations under a Drinking Water Works Permit
- Ontario Provincial Standard Specifications
- Region of Waterloo Design Guidelines and Supplemental Specifications for Municipal Services (DGSSMS)
- Ontario Building Code
- Region of Waterloo By-laws
- City of Waterloo By-laws
- City of Waterloo Policies
- City of Waterloo Drinking Water Works Permit
- Landscape Design Process and Requirements Manual for New Subdivision Development
- This development manual

Designs that are not consistent with the above requirements will not be accepted by the City until all inconsistencies have been rectified.

6.5.2 Submission of Engineering Design

Upon completion of the detailed design for the entire development, the Engineer shall provide two complete sets of the submission documents to the Director of Engineering Services. All drawings and supplementary reports must be stamped and signed by the Engineer responsible for their preparation.

A complete submission package will be comprised of, but not limited to, the following:

- Overall Servicing Plan indicating all municipal services, above ground site furniture, lot fabric and easements
- Storm drainage plan including both internal and external drainage areas, stormwater management facilities, and storm sewers including infiltration trenches and soakaway pits
- Sanitary drainage plan including both internal and external drainage areas
- Structural and hydraulic design sheets for both sanitary and storm sewers
- Lot grading plan for the entire development
- Erosion and sediment control plans
- Plan and profile drawings of proposed roads and services, complete with City approved nomenclature for all structures
- Landscape plans detailing all parks, open space, trail/walkway blocks, street trees, living fences and property demarcation requirements
- Tree saving and protection plans, showing all existing vegetation, and identifying all vegetation which is to be preserved
- Driveway location plan indicating all proposed street furniture
- Traffic calming, pavement marking, and signage plan, as required
- Watermain pressure/flow analysis, if required
- Miscellaneous detail plans, if required
- Stormwater management report
- Geotechnical Investigation of the lands, included recommendations for roadbase design
- Any additional studies required including Archeological Assessment, Traffic, Noise and Vibration Analyses
- Ontario Land Surveyor's calculated plan
- Complete detailed cost estimate for all municipal infrastructure (Schedule 'B')

It is the responsibility of the Engineer to ensure and certify that all drawings in the Engineering submission have been fully coordinated with each other.

The engineering review is an iterative process. After receiving the first submission comments from the City, the Developer's consultant will address all concerns and make all required changes to the design drawings and re-submit to the City for further review. Typically, a minimum of two submissions will be required to address all outstanding concerns.

The City will endeavor to complete its review of each submission and provide written comments to the Developer's consultant within 10 business days of receipt of a complete submission including receipt of Stage I engineering fee, unless the applicant is notified otherwise.

6.5.3 MOE Approval

Sewage Works

The statutory requirement for sewage works approvals is contained in section 53 of the Ontario Water Resources Act. Section 53 of the OWRA requires that an Environmental Compliance Approval (ECA) be obtained from the MOE before establishing, altering, extending or replacing a sewage works. The ECA requirements replace the earlier Certificate of Approval process. Existing certificates are subject to the new ECA requirements with respect to any terms and conditions for alteration and amendment.

An application form and a guide for completing the application form are available online at:

http://www.ene.gov.on.ca/environment/en/resources/STDPROD_090550.html

The Engineer is responsible for preparing all documents to be submitted to the MOE as part of the ECA submission.

Water Works

The Municipal Drinking Water Licensing Program has been created under authority of the Safe Drinking Water Act. Under this program, a Drinking Water Works Permit and a license are issued to the municipality to operate the drinking water system. Any alterations or proposed additions to the system require completion of a Form I "Record of Watermains, Authorized as a Future Alteration" available at

http://www.ene.gov.on.ca/stdprodconsume/groups/lr/@ene/@resources/documents/resource/std01_086698.pdf.

6.5.4 Engineering Acceptance

When all design issues have been addressed to the satisfaction of the Director of Engineering Services, the Engineer shall submit a final engineering design submission stamped "Accepted for Construction". All construction drawings must include City nomenclature for storm and sanitary works. The final submission will consist of three original bond copies of all drawings for stamping purposes, as well as electronic PDF and AutoCAD NAD 83 zone 17 files on CD. The City's Engineering Services Project Manager will stamp the Drawings "Approved", and return one copy to the Developer's consultant. Prints of the City approved drawings must be the only ones used for construction of the subdivision works.

6.6 Securities

The Developer is responsible for providing securities in letter of credit format for all underground services, surface works including landscaping, lot performance and erosion and sedimentation control works proposed in the development. The City standard letter of credit form is included in Appendix C. Securities are retained to ensure that proposed works may be completed by the City in the event that the Developer's obligations under the Subdivision Agreement are not met. Prior to execution of the subdivision agreement, the developer will be required to post separate securities for municipal servicing, lot grading performance and erosion control.

6.6.1 Initial Security for Municipal Servicing

Prior to construction of any servicing works, an initial performance security equaling 100% of the estimated underground services up to and including base asphalt must be posted with Financial Services. The total estimate shall be based on the construction value of the works, plus 15% for engineering and contingencies, plus applicable taxes. If the work has been tendered, the cost estimate shall reflect the tendered values. If the tendered amount of the work exceeds the value of the letter of credit, an increase in the posted security value may be required.

6.6.2 Security Reductions

Reductions to the posted letter of credit may be requested as work progresses. For a reduction to be processed, a written request must be provided to the City by the Engineer including the following information:

- Subdivision name including appropriate stage and phase
- Original, current and requested value of the security as well as the LC identification number
- A complete LC summary sheet outlining remaining and completed works (Appendix C)
- Applicable background information including payment certificates, invoices, updated cost estimate on an item by item basis.

The reduced value of the posted security will be equal to 15% of the completed works on maintenance, plus 100% of the outstanding works. Reductions may be requested once a year, or when the value of the newly completed works is in excess of \$50,000.

When a reduction or release has been approved, Engineering Services staff will forward a reduction request to the City's Financial Services Department. A letter will then be forwarded to the Developer's financial institution indicating that the value of the outstanding security may be revised and a copy will be provided to the Developer. It is the Developer's responsibility to follow up with the bank to confirm that the applicable adjustment is processed.

Underground Services

The initial security reduction request may be submitted when the installation of the underground services has been completed, and these works have been accepted for maintenance by the City. At this time, the value of the security will be adjusted to reflect 15% of the completed underground services, plus 100% of any outstanding items including surface works. A minimum amount of \$50,000 will be retained to secure underground works until the works have been assumed by the City. Details of the security reduction process are included in Appendix I.

Surface Works

A security reduction for outstanding surface works may be requested on a street by street, item by item basis. The letter of credit for this portion of the work must be equal to no less than 15% of the completed work plus 100% of the outstanding work, to a minimum value of \$10,000.00, provided that all underground works have been assumed. The remaining funds will be released on assumption of the surface works items. Details of the security reduction process are included in Appendix I.

Lot Performance

An initial amount of \$500 per lot shall be posted by the Developer to ensure conformance with the approved lot grading plan. This security may be reduced on a lot by lot basis when the City has received an acceptable Development Compliance Letter (DCL) (complete with as-recorded drawing and copy of the planting voucher) and City staff has confirmed the start of the two year maintenance period for that lot. A minimum amount of \$10,000 shall be retained until such a time as all lots in the development have been placed onto the maintenance period. Details of the security reduction process are included in Appendix I.

Erosion Control

A security equaling 100% of the total cost of all erosion and sedimentation control measures must be posted prior to any area grading works in accordance with the site alteration permit. Details of the permit requirements are outlined in Section 3.0.

When all erosion and sedimentation controls have been installed and inspected, the Developer may request that the letter of credit be reduced to 15% of the contract value of the works completed and 100% of outstanding work. The remaining 15% will be retained until such a time that the Subdivision Agreement has been entered into between the City and the Developer. At that time the current erosion control security shall be discharged and the outstanding 15% shall appear as line items for the ongoing maintenance of erosion and sedimentation controls. This remaining 15% will be reduced on a percentage basis of lots that have received lot grading approval out of the total number of lots.

6.6.3 Release

Upon final assumption of works by the City, the developer may request release of any remaining securities related to those works. For the final security release to be processed, a written request must be provided to the City by the Engineer including the following information:

- Subdivision name including appropriate stage and phase
- Original, current and requested value of the security as well as the LC identification number
- A complete LC summary sheet outlining remaining and completed works (Appendix C)
- Reference to the letter issued by the City confirming the date the works were assumed

6.7 Construction

Construction of the works as per the accepted design must be completed in accordance with the OPS General Conditions of Contract for Municipal Works. Installation of all works must be completed by contractors that are acceptable to the City.

The construction sequence will generally be as follows:

Site Grading

- Erosion and sedimentation control installation, tree protection fencing, buffer delineation, required signage
- Clearing and grubbing
- Area grading including stormwater management facilities and parks

Underground Servicing

- Sanitary Sewers
- Watermains and appurtenances
- Storms Sewers, including Infiltration Galleries, Clean Water Collector as required
- Granular Road Base
- Concrete curb and gutter
- Base Asphalt

Surface Works

- Landscaping of park blocks and SWM facilities
- Sidewalk, boulevard topsoil and sod, and driveway ramps
- Walkways, fencing, and trails
- Boulevard Trees
- Surface asphalt

No concrete or asphalt work may be completed after November 30th of each year unless specifically approved in writing by the Director of Engineering Services.

Surface works including sidewalk, boulevard topsoil and sod, street trees and driveway ramps for individual units are to be completed on a lot by lot basis. Between March and October, these items are to be completed no later than 2 months after the brickwork and garage floor have been completed, weather permitting.

Surface asphalt is to be completed on a street by street basis when all houses have been completed on a particular street or two (2) years after base asphalt has been placed, subject to approval by the Director of Engineering. Prior to placement of surface asphalt, City staff must inspect base asphalt and curbs and all deficiencies must be rectified.

Park blocks are to be constructed within one year of the issuance of the first building permit within the phase or subdivision or at the discretion of the Director of Engineering Services.

6.7.1 Tender and Award

The Developer may invite qualified contractors to tender bids on the proposed works unless City cost sharing is involved. If City funds will be used to complete any items in the contract, a public tender in accordance with City of

Waterloo Purchasing By-law will be required. Details of the public tender process are available online at www.waterloo.ca.

Prior to awarding the contract, the Engineer must provide written notice of the bid details to the City for review and approval of the successful contractor.

6.7.2 Approval for Construction

The City will authorize the Developer to commence construction upon receipt of the following:

- Written notice from the Developer of the proposed date of commencement, a minimum of two weeks in advance
- MOE Environmental Compliance Approval
- Form I Approval by City of Waterloo
- Accepted Engineering Drawings stamped for construction by the Engineer and City staff
- Accepted Cost Estimate submitted electronically in the form of Schedule B of the Subdivision Agreement
- Full Payment of all financial requirements, fees and securities as outlined in Sections 6.4 and 6.6
- Insurance Certificate as outlined in Section 6.3.2
- Letter stating how applicable draft conditions of approval have been cleared
- Stage II Environmental Monitoring Plan
- A complete set of executed contract documents including form of tender and specifications
- Confirmation that Ministry of Labour Notice of Project has been provided.

Written direction from the Director is required to proceed with any construction activities whatsoever.

6.7.3 Site Meetings

The Developer's Engineer shall notify the Engineering Services Project Manager at least one week in advance of all pre-construction and site meetings. Construction cannot proceed until a pre-construction meeting including the Developer's representative, the Contractor and Engineering Services staff has been held. Site meetings shall be held on a regular basis throughout construction to review progress and address any issues that may arise.

6.7.4 Inspection and Certification

The Engineer retained by the Developer shall supervise and inspect the installation of all works to ensure conformity with the accepted engineering drawings, contract documents and good engineering practice. The City shall have the right to inspect the installation of the works at any time without notice.

If the works are not being carried out in an acceptable manner, City staff may direct the Engineer to stop work until such time as the installation is completed to the satisfaction of the Director. The Engineer is required to provide written confirmation that all works have been completed in accordance the design, the contract, and good engineering practice.

6.7.5 Site Maintenance

It is the developer's responsibility to ensure that the impact of construction on adjacent properties, roadways and neighbourhoods is minimized. Roadways must be cleaned regularly and construction materials are to be stored neatly off the right-of-way. Clear access to the development and adjacent properties must be maintained at all times. The City has the right to rectify unsatisfactory site conditions as necessary. Work will be completed at the Developer's expense and invoiced or by drawing down the remaining securities.

6.7.6 Construction Lien Act

A holdback shall be applied to all payments until all conditions for holdback release have been completed in accordance with the Construction Lien Act. The Engineer shall be responsible for reviewing the completed works on a monthly basis and issuing a payment certificate to the contractor.

6.7.7 As-recorded Drawings

Within 30 days of building permit availability, the Developer is required to submit a field set of as-recorded drawings to the City. Red Line markups of all drawings indicating as-recorded watermain information are required prior to final connection of new watermains or services. Mylar copies of all drawings are required and the information shall also be provided digitally in both PDF and AutoCAD NAD 83 zone 17 formats.

As-recorded plans shall include surveyed information for all underground works, and they shall indicate the following information:

- City nomenclature of all structures and appurtenances
- Lengths, invert elevations and material type of all sewers
- Locations and invert elevations of all service laterals at the property line
- Lengths and material types watermains
- Locations of all water distribution fittings, including valves, hydrants, main stops, curb stops, tees, bends and valves complete with swing ties to visible structures
- Details of all vertical watermain deflections including dimensions indicated on Profile drawings

In accordance with section 3.5 of the City's Drinking Water Works Permit as issued by the Ministry of the Environment, all watermain additional modifications, replacements and extensions must be updated within specific time frames. Accordingly, complete as-recorded information for all new projects must be provided to the City within 6 months of installation of the applicable works.

6.8 Environmental Monitoring

Environmental monitoring is required prior to development in the City of Waterloo. Additional details of the monitoring process are outlined in the City of Waterloo Development Monitoring Protocol, as amended. The monitoring process is divided into 3 stages:

- Stage I – Pre development
- Stage II – During Construction
- Stage III – Post development

Sample report forms for all stages are included in Appendix D and digital copies are available on the City website www.waterloo.ca.

6.8.1 Stage I

Stage I monitoring of the site and surrounding area provides baseline information on the existing environmental conditions including on-site and adjacent surface and subsurface flow systems, terrestrial features and flora and fauna. The monitoring initiated in Stage I will be maintained throughout the three stages of the development. Terms of Reference should be submitted for approval to the agencies have jurisdiction (GRCA, City, and Region) at least two years in advance of a development application being filed on a property. Annual reports outlining details of the initial monitoring results are required. The Terms of Reference are to be revisited at the end of Stage I and revised, if necessary, prior to commencement of Stage II.

6.8.2 Stage II

Proposed monitoring protocols for the construction phase should be submitted to the City and GRCA for review prior to the Site Alteration Permit application. Stage II monitoring should look specifically at the erosion and sediment controls to be implemented on site during construction and the performance of any constructed control features (i.e., stormwater management ponds, channel works) including any 3rd pipe systems. For that reason, Stage II monitoring should start with the beginning of construction activities on the site (i.e., topsoil removal, grading, etc.) and extend until 90% of the tributary area to a particular SWM facility is stabilized.

Based on current agency (GRCA) criteria, Stage II monitoring of sediment controls should take place at least weekly. The reports for this part of the program can be tailored to the specific measures proposed for the property, but are generally brief, checklist-style reports that identify any measures that need repairs or replacement.

The submission of results of the Stage II monitoring should be based on two schedules. Regular monitoring reports for the assessment of erosion and sediment control measures should be submitted to both the City of Waterloo and the GRCA on a weekly basis during active construction periods. During periods of no construction, reports should be submitted monthly. A brief annual summary of these reports should be submitted to the City outlining any recurring problems with the erosion and sediment control measures and proposed means of rectifying the problem.

The Stage II monitoring is a continuation of the monitoring commenced in Stage I. Raw data will be forwarded to the Environmental Resource Planner in Policy Approvals at the City. The data is to be provided in an electronic format on a seasonal basis and one annual report should be submitted to the City summarizing the information gathered and discussing any observed trends or other implications of the results. Should any monitoring reveal unusual or unexpected results, the proponent should notify the City immediately and forward the supporting information along with an assessment of the proposed mitigation measures. The actual data submitted will depend on the environmental features identified for monitoring, but would generally include the results of any surface water and/or groundwater quality chemistry analyses, surface water flows, groundwater levels, assessment of vegetation health, etc.

6.8.3 Stage III

Stage III monitoring should be initiated following the satisfactory completion of the Stage II monitoring program and should continue until the satisfactory completion of the maintenance period for the development. Terms of Reference are to be reviewed again at this time and revised, if required.

With the construction work on site completed at the end of Stage II, the monitoring requirements for Stage III include a continuation of the Stage I monitoring and the monitoring of the stormwater management practices implemented for the site.

As indicated executed Subdivision Agreement the monitoring will focus on the following areas:

- Continued monitoring of the parameters noted in Stage I
- Stormwater management practices
- Stream rehabilitation works
- Vegetation and aquatic health

The results of the Stage III monitoring program shall be reported to the City on an annual basis, unless there are unusual or unexpected results (which should be reported immediately). The annual report should include a summary of the data gathered and discussion of the implications of that data. The actual data submitted will depend on the environmental features identified for monitoring, but would generally include the results of any surface water and/or groundwater quality chemistry analyses, surface water flows, groundwater levels, assessment of vegetation health and aquatic habitat, etc.

Following successful completion of Stage III monitoring, the City will accept responsibility for ongoing operation and maintenance of the implemented measures.

6.9 Building Permits

Building permits for residential house construction are issued by the Building Standards Division of the Integrated Planning and Public Works Department. In order to release Building Permits for a subdivision, the Chief Building Official must be satisfied that municipal services are operational and meet City of Waterloo standards. The Engineer shall certify to the City that the following items are complete:

- The Plan of Subdivision has been registered on title
- The subdivision agreement has been registered on title
- All sewers, watermains and roadworks have been constructed to City of Waterloo standards and passed initial inspection
- Storm and sanitary sewers have been flushed and clear of all debris

- Watermains and fire hydrants are operational and any need for pressure reducing valves has been confirmed
- Water valves are visible, operational, and “plumb”
- Water boxes are visible and “plumb”
- Tracer wire has been tested and approved
- All roads, including emergency accesses, have been completed to curb and base course asphalt. For late season construction when weather conditions do not facilitate paving, roads may be completed to the granular ‘A’ course, with approval of the Director

Notwithstanding the foregoing, a building permit for one (1) model home per registered plan, may be issued provided the Engineer certifies that municipal water is available for said lot for both domestic supply and fire protection, and that the site is accessible to emergency vehicles.

Upon receipt of certification from the Engineer and confirmation from the City of Waterloo Water Services Division that the bacteriological tests on the water samples submitted to the Region of Waterloo lab are acceptable, the Consultant will schedule:

- A Joint inspection of storm and sanitary sewers systems, and roads by City Staff and the Engineer
- Inspection and satisfactory operation of all water valves, hydrants and tracer wire by Water Services staff
- Installation of street and traffic control signs by City staff

Mylar and electronic copies of the registered plan must be provided to Integrated Planning and Public Works by the Developer’s OLS.

When City staff have confirmed that all required items are complete and functioning as designed, the Engineering Services project manager will provide written notification to the Building Standards Division to confirm that the above criteria have been met.

Building standards will then review the following items:

- All requirements set out in the building permit application have been approved by Building Services
- The Lot Development Plan has been approved by the Developer’s Engineer and submitted to Building Services
- All associated building permit fees, deposits and Development Charges have been paid

If the above is in order, building permits for the development will be released.

6.10 Maintenance Period

In accordance with the OPS General Conditions of Contract, and the associated supplementary general conditions, all works shall be guaranteed for an applicable period. The warranty or maintenance period will begin upon confirmation that the works have been constructed in accordance with the accepted plans and that they are free from defects. Commencement of the maintenance period dates will be provided in writing by the Engineering Services Project Manager for Underground Services to Base Asphalt, and Surface Works and Stormwater Management facilities. The typical duration of the maintenance period shall be as follows:

- Underground Services to Base Asphalt 2 years
- Surface Works 2 years
- Stormwater Management facilities 2 years for servicing
2 years for landscaping
Clean out and maintenance on 90% build out

The Engineering Services Project Manager will start the maintenance period on consideration of the following dates:

- The date that the works were inspected and, from the visual inspection, appeared to be completed to City Standards
- The date that deficiency repairs were carried out
- The date the Engineer submits all the required documentation (see section 6.10.1)

If deficiencies are noted, the Project Manager will notify the Engineer of major deficiencies that must be repaired prior to commencement of maintenance and minor deficiencies that may be repaired prior to the end of the Maintenance Period.

6.10.1 Start of Maintenance

Underground Services to Base Asphalt

The following items must be complete and free from defects prior to commencement of maintenance period for underground services up to and including base asphalt, curb and gutter:

- All sewers, watermains and roadworks have been constructed to the City of Waterloo standards
- Storm and sanitary sewers have been flushed and clear of all debris
- Watermains are operational
- Water valves are visible, operational, and “plumb”
- Water boxes are visible and “plumb”
- Tracer wire is successfully tested
- Roads have been completed to curbs and base course asphalt, unless otherwise directed by the Director

Upon completion of the above items, the Engineer shall provide confirmation that all sewers have been cleaned and flushed. Immediately upon completion of construction, the developer shall notify the Engineering Services Project Manager and provide a copy of the as-recorded “field set” drawings of the water system.

The Engineer shall then contact Integrated Planning and Public Works and request an inspection of the underground works. A minimum of 3 business days prior notice of the inspection date is required. A visual inspection of all sanitary, storm and water works, including appurtenances and connections as well as roadbase, base asphalt and curb shall be conducted by Engineering Services staff along with the engineering consultant.

After satisfactory completion of the visual inspection, the Engineer shall submit a Maintenance Package to Engineering Services. The package shall include a stamped covering letter providing certification that all the works within the particular phase have been completed in accordance with the accepted design, and lists all the items included. Some of the items included in the maintenance package are required to be submitted periodically during construction. Submission dates for these items should be noted in the covering letter.

A typical Start of Maintenance Package would include the following:

- Pre-construction test results – Granular sites, mix designs, etc
- Sieve analysis and compaction testing of sewer and watermain bedding material
- Sieve analysis and compaction testing of road subgrade and granular base courses
- Asphalt tests of the base asphalt courses, marshall testing, compaction, etc.
- Concrete tests for curb and gutter - air, slump, 28 day strength, etc.
- Watermain test results including, bacteriological analysis, residual chlorine, leakage/pressure testing, etc.
- Exfiltration / infiltrations testing of sanitary and storm sewers (air testing preferred for PVC pipes)
- CCTV inspection is to be provided after 40 days of the sewers have been installed and is to follow the SSMS Specifications
- Outstanding construction inspection reports

- Outstanding Erosion & Sedimentation Control Monitoring reports
- A letter certifying that all of the requirements of the subdivision agreement have been met and that the works have been constructed in accordance to City standards

A checklist of the above items is included in Appendix E.

Deflection testing of all flexible pipe shall be completed in accordance with OPSS and DGSSMS. Maximum deflection shall not exceed 7.5 % of the base inside diameter of the pipe.

The Engineer shall provide a tabular summary and analysis of all test results included in the package. The summary shall identify:

- Date of test
- Type of work e.g. watermain, storm/sanitary sewer, roadbase, curb, base asphalt etc.
- Type of material tested e.g. bedding, cover, backfill, granular, earth, asphalt, concrete, etc.
- Location including street name, chainage, lot number, proximity to structures
- Testing standard, specified level, actual level, result i.e. pass or fail
- Retest date and result of any failed tests

Sufficient testing must be completed to provide a representative sample of all works completed at all locations within the development. Deficiencies or failed tests must be addressed in detail to the satisfaction of City staff as part of the analysis of the test results.

If the complete Maintenance Package is submitted within sixty days of the visual inspection, the Commencement of Maintenance may be back dated to the date that the major rectifications were completed. However, if the maintenance package is deficient or not submitted in a timely fashion, the Commencement of Maintenance date will not start until the complete package has been received and accepted by Engineering Services. The maintenance period for all underground works will only begin when all items have been confirmed complete by City staff.

Incomplete maintenance packages will be returned to the Engineer for resubmission.

Surface Works

Surface works may be accepted within each phase on a street by street, item by item basis, for the following items:

- Traffic Signage
- Sidewalk
- Driveway ramps
- Parks & Open Spaces
- Boulevard landscaping, including topsoil, sod and trees
- Surface asphalt
- Entrance features
- SWM plantings, living fence, property demarcation, trails, rear lot planting, and buffers
- SWM ponds
- Noise mitigation measures, sound barriers
- Walkway blocks including surface asphalt, fencing and bollard gates
- Emergency accesses

A representative from the City and the Developer's Consultant shall conduct a visual inspection. The City will require a minimum of two weeks prior notice to schedule an inspection date. All items must meet City standards and specifications and all deficiencies so noted shall be repaired to the City's satisfaction prior to commencement of maintenance.

The maintenance package for surface works shall include the following, if applicable:

- Asphalt tests of the surface asphalt courses, AC content, compaction, etc.
- Pre-construction test results – mix designs, etc.
- Concrete tests for sidewalk confirming air, slump, 28 day strength
- Compaction testing for granular base
- Construction inspection reports

The maintenance package for parks and trails shall include the following information, if applicable:

- Asphalt tests including AC content, compaction, etc.
- Compaction testing for granular base
- Playground equipment audit
- Playground manual and tool kit
- Topsoil verification letter

The Engineer shall provide a summary and analysis of all test results included in the maintenance package, similar to the requirements for underground services. The Engineer shall confirm in writing that all of the requirements of the subdivision have been met and that the works have been constructed in accordance with all applicable standards. A checklist for surface works maintenance items is included in appendix E.

When all the required documentation has been received and reviewed by the City, all inspections of the works performed and all deficiencies rectified, the date for commencement of maintenance will be established. The City will not back date commencement of maintenance due to delays in receiving outstanding paper work or delays in rectifying noted deficiencies.

6.10.2 Developer Obligations during the Maintenance Period

It is the developer's responsibility to minimize the impact of construction on the surrounding community. Developer obligations throughout the subdivision process are specified in the Subdivision Agreement; and key items are indicated below.

Underground Services to Base Asphalt

- Maintain all erosion and sedimentation controls, repair as required and document all inspections and work completed
- Maintain all underground services
- Repair all significant deficiencies or damage as directed
- Monitor and maintain street and storm drainage
- Ensure infiltration trenches, soakaway pits, and quality control structures are functioning as designed
- Inspect catchbasin and catchbasin maintenance holes on an annual basis, and clean as required
- Sweep streets on a weekly basis during the construction season (April to November)
- Scrape streets as required
- Flush and clean all storm and sanitary sewers if conditions warrant
- Install pavement markings on base asphalt
- Maintain a logbook of maintenance issues outlining any failures and deficiency repairs for submission to the City at the end of the maintenance period

Surface Works including Landscaping

- Maintain all surface works and landscaping items including trees, shrubs, and turf
- Regularly inspect playground equipment and remove garbage from trash receptacles in Park Blocks
- Repair all significant deficiencies or damage as directed
- Sweep streets on a weekly basis during the construction season (typically April to November)
- Scrape streets as required
- Pay for the initial installation of all signs within the development
- Replace all damaged or stolen signs during maintenance
- Complete all pavement markings on surface asphalt

Stormwater Management Facilities

- Maintain all erosion and sedimentation controls and repair as required
- Inspect all SWM facilities monthly and within 24 hours of each significant rainfall event
- Submit log sheet detailing performance and drain down times for all ponds, infiltration trenches, sand filters, etc.
- Maintain detailed records of any alterations to SWM facilities

Deficient or damaged works observed by the City during the maintenance period will be documented for corrective action by the Developer. If deficient or damaged items are not repaired in a timely manner by the Developer, the City may complete the required works at the Developer's expense.

Items that are considered to be emergency repairs will be completed by City crews as required at the Developer's expense. Notification will be provided as soon as practical.

6.10.3 Final Acceptance

When the maintenance period expires, a complete review will be undertaken to confirm that the materials, workmanship and installation of the all works are free from defects, functioning as designed and meeting municipal standards. Upon successful completion of this review, the works will be assumed by the City and accepted into the municipal infrastructure.

Underground Services

Prior to the expiration of the maintenance period, the Engineer shall initiate a review of the underground services to confirm that they are acceptable for assumption. The review shall incorporate cleaning, flushing and CCTV inspection of all sewers, and visual inspection of all undergrounds.

After all sewers have been flushed, a final CCTV inspection shall be undertaken. The Developer must engage the City's annual CCTV Contractor to complete the final inspection unless an alternative Contractor is authorized in writing by the Director of Engineering Services. All reports and videos must be formatted in accordance with City guidelines and City nomenclature for all sewers and structures must be used. CCTV inspection requirements are included in Appendix J.

A visual inspection of the underground services (sanitary, storm and water, including appurtenances and connections), roadbase, base asphalt and curb shall be conducted by representatives from Engineering Services, the developer's consultant and the contractor. City staff will require a minimum of two weeks prior notice to schedule an inspection date. All items must meet City standards and specifications in the entire stage of the subdivision and all deficiencies so noted shall be repaired to the City's satisfaction prior to final assumption.

When all final testing is complete, the Engineer shall provide a written request for assumption including the following items:

- Certification by the consultant that all items are free from defects and functioning as designed
- The date of the final inspection and names of those in attendance
- Copies CCTV videos and reports
- Two (2) complete sets of "as-recorded" mylars updated to reflect City nomenclature for all pipes and structures of all plans or the entire subdivision
- A maintenance log indicating all repair activities undertaken during the maintenance period
- A statement by a registered Ontario Land Surveyor that all standard iron bars and monuments as shown on the registered plan have been found or replaced

Incomplete end of maintenance packages will be returned to the Engineer for resubmission.

Upon receipt of written confirmation that all works have been assumed, the developer may request release of the associated securities.

Surface Works

Final assumption of surface works may be requested within each phase on a street by street, item by item basis.

A visual inspection of the surface works to be assumed shall be completed by a representative from the City and the consultant. The City will require a minimum of two weeks prior notice to schedule an inspection date. All items must meet City standards and specifications and all deficiencies so noted, shall be repaired to the satisfaction of the Director prior final assumption.

Upon confirmation by the City that all surface works are in order, the Engineer shall provide a written request for assumption including the following items:

- Certification by the consultant that all items are free from defects and functioning as designed
- The date(s) of the final inspection and names of those in attendance
- A maintenance log indicating all repair activities undertaken during the maintenance period

Upon receipt of written confirmation from City staff that all works have been assumed, the developer may request release of the associated securities.

Stormwater Management Facilities

All stormwater management ponds and facilities shall be cleaned of debris and sediment prior to final acceptance. Additional flushing of the storm system may be required at this time.

Final acceptance of stormwater management works is contingent upon complete development of all contributing areas. Undeveloped lands continue to have adverse impacts on the downstream sewers and SWM facilities in the completed areas. Extension of the associated maintenance period for SWM works beyond 2 years will be required if buildout is not completed within that time frame. Procedures to transfer the responsibilities from one Developer to another as per the subdivision agreement will be provided at final acceptance of downstream works.

6.11 Lot Grading

The grading of each lot within the development must conform to the accepted design grades of the subdivision. It is the developer's responsibility to confirm that lots are graded correctly by the specific builder for each individual lot. Prior to acceptance of lot grading by Engineering Services staff, the following documentation must be submitted for review:

- Development Compliance Letter (DCL)
- As-recorded drawing
- 'Spruce Up Your City' verification, if applicable

6.11.1 Approved Representative

Certification that the lot is in conformance with the accepted subdivision grading plan shall be provided by an approved representative or qualified professional. Qualified professionals are as follows:

- Registered Professional Engineer (P.Eng.)
- Registered Ontario Land Surveyor (O.L.S.)
- Certified Engineering Technologist (C.E.T.)
- Applied Science Technologist (A.Sc.T.)
- Certified Technician (C.Tech.)

This representative must be authorized by the Developer to inspect the lot grading, prepare and submit the Development Compliance Letter (DCL) and the "as-recorded" drawing to the City on the Builder's behalf.

It is the responsibility of the Developer to submit a list noting all authorized Representatives to the City prior to requesting any lot grading releases. Should the Developer not chose to submit such a list then the City will assume that the Developer's consultant is the only one authorized to act as his representative and all others will be rejected.

6.1.1.2 Development Compliance Letter

The Development Compliance Letter (DCL) is a standard form supplied by the City of Waterloo that lists the applicants information, legal description, municipal address and a checklist detailing conformance to items such as lot grading, tree saving, rear yard planting, rehabilitation and naturalization. This letter must be completed in full, signed and submitted to the City by the approved representative along with the as-recorded drawing. A copy of this form is included in Appendix E.

6.1.1.3 As-recorded Drawing

When all grading activities have been completed and the lot is sodded, the representative is responsible to perform a visual inspection and a survey of the lot to verify that the lot adheres to the intent of the accepted grading plan as prepared by the Developers consultant. The representative shall then record the as-recorded grades and elevations on a drawing and submit it to the City for review.

At a minimum, the submitted drawing shall:

- Be scaled to the original site plan scale used at time of building permit request
- Include the dated of the survey and visual inspection was performed
- Include both design and “as-recorded” elevations for key locations. Key elevations shall be defined as all lot corners, split drainage points, top and bottom of all embankments, drainage swales, house corners with spot elevations in side yard swales adjacent to corresponding house corner, driveways at house and property line, any obvious low points and/or areas of settlement and in the case of Type ‘A’ lots spot elevations for the rear apron
- Show slopes in percentage along all swale routes complete with directional arrows
- Show locations of all downspouts and window wells
- Include all modifications (i.e. decks, sidewalks, patio’s, pools, raised gardens, fencing, etc.) that may affect the lot drainage patterns
- Provide adjacent lot/block numbers and fronting street name
- Include a legend that clearly indicates design and as-recorded information
- Be stamped and signed by the approved representative

Drawings that do not incorporate the above information, or that are found to be deficient or illegible, will not be reviewed and resubmission will be required.

6.1.1.4 Planting Voucher Verification

In a joint initiative with the Waterloo Region Home Builders Association and local nurseries, the City of Waterloo implemented the “Spruce Up Your City with Backyard Planting” program. This program replaced the requirement for developers to prepare a Rear Yard Planting Plan. The program incorporates a planting voucher, in the amount of \$250.00, issued by the builder to the homeowner.

With the building permit, the City provides the publication entitled “Spruce Up Your City with Backyard Planting” to the Builder. This booklet contains instructions for the homeowners, list of approved planting material, and planting voucher. In order to fulfill the requirements of the planting voucher system, builders are required to:

- Sign or stamp the planting vouchers (homeowners copy and planting verification) found on the inside back cover of the booklet
- Have a local nursery sign or stamp the same planting vouchers
- Provide the booklet to the homeowner and have the homeowner sign the planting voucher verification
- Submit the completed planting voucher verification to the City of Waterloo, Development Engineering

Lots to which this system applies cannot be granted final lot grading release or the corresponding security reduction until the planting voucher verification is received by the City of Waterloo.

6.1.1.5 Review and Acceptance

Upon receipt of the DCL submission, the City will review the contents to assess whether or not:

- The package is complete and legible
- The DCL is complete and correct
- The as-recorded drawing contains all required information
- The grades match the intent of the approved lot grading plan
- The submission package meets any other requirements that may have been imposed on the lot as part of the subdivision agreement or as a condition of draft plan approval
- A voucher, if applicable has been received for the lot in question
- The lot release fee has been paid
- Any complaints received by the City have been resolved

When reviewing the submission package for compliance with the intent of the accepted lot grading plan, the City will spot check that all grades closely match those found on the accepted lot grading plan and that all swales meet minimum city standards. If a lot submitted does not meet the intent of the accepted lot grading plan or when the grades and/or elevations deviate from City standards, corrective action will be required prior to acceptance by the City.

Prior to 1995 lot release fees were not collected at time of building permit application, therefore this fee will have to be collected at time of final lot grading release submission. The City will notify the Builder in writing to obtain the lot release fee prior to releasing the lot grading from the subdivision agreement. Post 1995 lot release fees have been collected at time of building permit application.

When the City accepts the lot grading, copies of the signed Development Compliance letter will be mailed to the Developer, the approved representative and the builder. In cases where the lot has been rejected or held, only the representative will be notified. It will his/her responsibility to notify all other effected parties.

6.1.1.6 Maintenance Period

Once the City has approved the lot grading, the Builder/Developer shall be responsible for all drainage complaints for a minimum period of two (2) years or until such time as all outstanding works and deficiencies have been corrected to meet the accepted grading plan. During that two-year maintenance period, if the City receives a grading complaint, the City will direct the complaint to the representative. The representative is expected to address any such complaint in a timely fashion and will notify the City as to the solution.

If resolution to any problem received during maintenance period has not been reached, it will be the developer's responsibility to address the problem to the City's satisfaction. The Developer and/or Builder will be responsible for any remedial actions required.

When the two-year maintenance period is complete and all drainage concerns have been addressed to the satisfaction of the City, the City will grant the Developer final lot grading approval.

6.1.1.7 Security Reduction

When a lot has been placed on the maintenance period, the lot performance security is eligible to be reduced. Reduction requests shall include the following information:

- Original value of the LC
- Current value of the LC
- New requested value of LC
- Total number of lots in subdivision
- Number of lots submitted to the City for acceptance
- Number of lots released by the City

Once all information has been verified, the Engineering and Construction staff will process the request and notify Financial Services to reduce the applicable security. A minimum of \$10,000 will be retained for Lot Performance until such time as all lots in the development have been granted final approval.

6.11.8 Future Drainage Complaints

After final lot grading acceptance, if a complaint is received by the City as a result of damage and/or alterations to the lot by the developer, builder or their agents, the responsible party shall rectify the situation to the satisfaction of the City and/or homeowner.

6.11.9 Final Lot Grading Release

Final lot grading release will occur when the Developer is released from the subdivision agreement. The Developer may request a partial lot grading release for an area provided that all lots are completed, approved and any complaints received have been addressed to the satisfaction of the City and homeowner.

6.12 Final Release from the Subdivision Agreement

When individual conditions of the subdivision agreement have been addressed, the City may release the Developer from the applicable condition. At the City's discretion, release from the agreement may be granted for any lot or block if all terms and provisions have been met with respect to the particular lot or block. All costs associated with the release shall be the responsibility of the Developer.

Upon written request and payment of any applicable fees, the City will provide a compliance letter with respect to any part of the Agreement that has been completed.