MUNICIPAL SERVICING STANDARDS

TOWNSHIP OF WELLINGTON NORTH

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MANUAL OF MUNICIPAL SERVICING STANDARDS

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MANUAL OF MUNICIPAL SERVICING STANDARDS

THE CORPORATION OF THE TOWNSHIP OF WELLINGTON NORTH

1. PROCEDURE AND DESIGN CRITERIA

A. GENERAL REQUIREMENTS

The Township of Wellington North has adopted the following procedure for the design and construction supervision of Municipal Services.

A.1 Definitions

In these standards the following definitions shall apply:

"Municipality" shall mean the Municipality of Wellington North

"Developer" shall mean the Owner or party specifically named in the Development Agreement or in the Subdivision Agreement.

"Developer's Engineer" shall mean professional engineer(s) licensed to practice in Ontario and shall be responsible for the preparation of drawings, specifications, reports and to act on behalf of the Developer in all technical aspects of the Development.

"Planner" shall mean the County and/or the Municipality's Planner or their designate.

"Contractor" shall mean the firm of Contractors, the company of individuals acting as the Contractor and having entered into a contract with the Developer to construct the Development.

"Municipal Engineer" shall mean the Director of Public Works or their designate from the Municipality.

"Local Roads" are to provide land access; they are not intended to move large volumes of traffic.

"Arterial Roads" are intended to carry large volumes of all types of traffic moving at medium to high speeds.

"Collector Roads" provide both traffic service and land service by carry traffic between local and arterial roads.

A.2 Planning Process

In the Township of Wellington North, Plans of Subdivision and Condominiums) applications are to be submitted to the County of Wellington. Application packages and associated guides are available through the County which will provide an overview of the steps to make an application and obtain a decision on a specific proposal. Site Plan applications are to be submitted to the Township.

The County of Wellington Planning Department should be contacted to arrange for a Preconsultation meeting prior to initiating the planning process for any development. The Preconsultation will assist to identify key planning issues as well as any major technical items including studies (i.e., traffic, noise, servicing, etc.) that may be required as part of the formal submission. The applicant may wish to have their consultant (planners, engineers, etc.) present at this initial meeting. It is anticipated that the following items would be discussed or reviewed:

- County will confirm the Official Plan designation and Zoning, identifying any Official Plan and Zoning amendments which may be required in addition to draft plan approval
- The necessary application requirements including fees, supporting documents (contour plan, general plan of services, drainage plan, preliminary Stormwater management plan, etc.), draft plan drawing requirements, and possible agreements that may be required.
- Timelines and potential scheduling for public hearing and Council meetings.

Following submission of a complete application, it will be processed by Wellington County staff, who will circulate it to the Municipality, community organizations and required public bodies for comments, as well as to all property owners in the vicinity of the subject site. A Public Meeting must be held, usually in the community, to provide information on the proposed application and to allow the public to provide comments. The County will work with the applicant to address any agency and/or public concerns. A comprehensive report will be prepared by the County planner, along with draft plan conditions (based on input from agencies and the public) and presented to Wellington North Council for review. Council will let Wellington County know if it is in support of the application.

The County Planning Director can then make a decision to approve or to refuse the draft plan application. This decision is subject to a 20 day appeal period. If there are no appeals, the draft plan is in effect.

As noted, there will be a number of conditions that must be satisfied before final approval of the development can be given by the County. Among the conditions is a requirement that the owner enter into a development agreement with the Municipality regarding matters such as the construction of roads and servicing which will require the completion of engineered drawings to the standard

contained herein. It is the responsibility of the applicant to insure that the conditions are satisfied

a) Site Plan

Site Plan Control applications are typically for developments where the land use principle has already been established (i.e. permitted by the Official Plan and Zoning). The application is to be submitted to and approved by the Township. Matters are limited to site design details such as stormwater management, parking, sidewalks, easements, road widening, lighting, waste storage areas, landscaping, etc. A public meeting is not required for the site plan control process. Comments will normally be made by the conservation authority for stormwater management and sometimes by the County where the development abuts a county road. Wellington North Council makes the decision to approve site plans. The Planning Act does not provide for an appeal by the public. A development agreement is normally required between the municipality and the owner.

A.3 Engineering Process

Following acceptance and approval of the draft plan, the developer shall proceed to the engineering phase of the development process which will include a number of submissions including preliminary and follow-up submissions as required. Prior to the commencement of the Engineering Design, the Developer's Engineer shall obtain copies of the Municipality's Development and Servicing Standards to familiarize themselves with the requirements of the development design in the Municipality.

The initial submission of engineering drawings shall be delivered to the Municipality and should include copies of the preliminary drawings and servicing (functional design) report(s). The initial submission of engineering drawings shall also contain a declaration from the Developer's Engineer showing that they have retained to design and supervise the construction of the development according to the terms of the Development Agreement. The purpose of the initial submission is to review the general design concept prior to the Developer proceeding to detailed engineering. In some cases, this information may have been provided in conjunction with the Draft Plan process. The preliminary drawing and report should consider items such as existing conditions, road alignments, cross section details, railway crossings, parkland dedication, trunk sewer, storm water management and drainage, water distribution, lot grading, sewage conveyance, etc. this document becomes particularly important when servicing is to be phased in conjunction with the development plan. When a development is being phased the servicing report is to include details of how the phasing will occur and how infrastructure may be impacted by such phasing. The

servicing report shall confirm that the servicing design does not limit future development areas. Comments may be provided related to any issues that are evident and the Developer will be asked to update the Engineering Drawings accordingly.

The Developer may be required to submit hydrogeological, hydrology, traffic, acoustical, geotechnical, archaeological, biological or other studies. Appropriate engineering or other consultants shall be retained to complete these reports as part of the applications and submissions required. The Developer's Planner and/or Engineer shall consider future adjacent land uses, and all design and layout of services shall incorporate considerations with respect to future servicing, grading and drainage issues on the adjacent lands, Upon completion of designs and submissions, sufficient copies of preliminary design briefs, agency approval submissions and all final drawings and reports shall be submitted to the Municipality for review by the Municipality and their Engineer.

Submissions are to be made until the Engineering Drawings, design and reports, are acceptable to the Township of Wellington North and the Municipal Engineer.

Additional details related to drawing requirements and approvals are provided in later sections of this document.

A.4 Planning and Reports

Prior to the design of a project being undertaken, the Developer will provide various reports which discuss the requirements for the project. The reports shall include but will not necessarily be limited to the following:

a) Planning Report

All proposed plans of subdivision applications must be accompanied by a Planning Report. This report will briefly describe, site orientation, site issues and inter-relationship of site issues. The report provides a starting point for analysis of the development proposal. This report is not to replace any detailed or specific reports identified during any submission consultation.

b) Environmental Impact Study (EIS)

With the growing concern for the preservation of natural heritage features and ecological functions and the protection of groundwater resources, there is a need to assess new development and municipal infrastructure projects for environmental impacts both comprehensively and on a project specific basis.

An Environmental Impact Study, if required, shall be prepared by a qualified professional prior to development in order to investigate potential environmental impacts of the proposed undertaking. An Environmental Impact Study will determine whether development may proceed and, if so, will identify actions which could be taken in order of preference to prevent, minimize, mitigate or compensate the environmental impacts of the development.

Any Environmental Impact Study shall be completed in consultation with the appropriate agencies in accordance with the Township's Official Plan, Grand River Conservation Authority, Saugeen Valley Conservation Authority, Maitland Valley Conservation Authority, Ministry of Natural Resources and Forestry policies, and/or Federal Department of Fisheries and Oceans and/or any other applicable government agency policies or legislation.

c) Source Water Protection/Geotechnical Investigation/Soil Report/ Hydrogeological Investigation

All proposed plans of subdivisions may be required to provide supporting documentation including a Geotechnical Investigation, Hydrogeological Investigation and a Source Water Protection Review as deemed necessary by the Township and/or Conservation Authority. These investigations shall be required to be carried out by a competent consulting engineer in order to assess conditions with respect to the proposed infrastructure, building construction and source water protection for the municipal water supply.

The Source Water Protection review shall conform to the requirements of the Clean Water Act, 2006 (as amended from time to time), the applicable Source Protection Plan (as amended from time to time) and all requirements regarding Source Water Protection included in the Township of Wellington North and County of Wellington Official Plans (as amended from time to time).

For the construction of new roads or underground utilities, a geotechnical investigation will be required. The purpose of the investigation will be to determine the type of soil, its engineering properties, bearing capacity, soil permeability, location of groundwater and to verify whether contamination is present.,. Soil investigation work is to take place after determining the proposed sewer or watermain alignment, so that the required boreholes and test pits follow the same alignment. Undersides of footing elevations for all basements of buildings are to be 0.6 m above the seasonally high groundwater elevation.

Soil test borings will be placed at suitable spacing to provide adequate representation of the soil conditions. Additional boreholes may be required

to establish the water table for storm water management ponds and to design the foundations of outfall structures. In fill areas or areas close to water courses, piles may be required to achieve satisfactory bearing strength to support any proposed infrastructure. Bedrock profiles will be required to be submitted where applicable.

Groundwater monitoring may be required if deemed applicable. Predevelopment groundwater monitoring can be carried out by advancing boreholes including monitoring wells on the site. Several seasons of data may be required to finalize recommendations related to groundwater. Upon commencing site development, monitoring wells may have to be relocated to areas such as parks, walkways or street boulevards if longer term monitoring is required. Typically, general information from base mapping etc. will not be sufficient.

The geotechnical report will make recommendations for the design of the road base, pipe bedding, construction methods, and soil percolation rates to determine the feasibility of stormwater management infiltration works.

d) Servicing Design Brief or Functional Servicing Report

The intent of the servicing design brief report is to evaluate the effects of a proposed change in land use or development on the Township's municipal servicing infrastructure and watercourses. The Township will assist with evaluation of the off-site infrastructure impacts/capabilities as required and information is available. The Developer will be responsible for costs associated with this assistance.

The report should also address the adverse impacts, if any, of providing this servicing on any environmentally sensitive features (e.g., Areas of Natural and Scientific Interest, Environmental Sensitive Areas and hydrologically sensitive areas, etc.).

The report shall include a preliminary plan for sanitary sewer servicing, and another separate plan for preliminary storm sewer servicing. Each plan is to include pipe inverts, to illustrate how the system will properly drain and match into existing conditions.

The report shall also outline the design assumptions, overall impact on the trunk and local municipal service capacities, such as: location and capacity of municipal water supply, storm drainage outlet and sanitary sewer outlet, water treatment plants, water distribution systems and pressure zones, pump stations, wastewater treatment plants, trunk sewers and stormwater management facilities, etc. due to the proposed change in land use or development, functionality of proposed and existing services, calculations, supporting documentation and references to previous studies, for each component of the development.

e) Preliminary Grading Plan

All proposed plans of subdivisions must be accompanied by a Preliminary Grading Plan. This plan shall include proposed grades and elevations at key locations to show how the proposed subdivision will meet lot grading and roadway grading requirements. Existing condition elevations are to be shown where matching proposed grades. Cross-sections shall show how the site will be graded.

The design and calculation of overland flow routes are to be included to understand impacts on the proposed and surrounding lands.

f) Water Distribution Report

The Water Distribution report is to be submitted and shall address water distribution systems, pressure zones, water consumption - estimated consumption, current capacities of trunk systems, phasing, net impact due to the proposed change in land use or development, need for expansion and upgrades. The Township will assist with evaluation of the off-site infrastructure impacts/capabilities as required and information is available. The Developer will be responsible for costs associated with this assistance.

g) Stormwater Management (SWM) Report

Refer to Section D2 - Stormwater Management

h) Transportation Impact Study (TIS)

Consideration should be given to the impact of new traffic from the proposed subdivision on the adjacent road system. The Township, County of Wellington or Ministry of Transportation may request that a Transportation Impact Study (TIS) or report be undertaken should it be deemed necessary.

i) Environmental Site Assessment (ESA) Subdivision

An Environmental Site Assessment (ESA) may be undertaken when a portion of the site is to be dedicated to the Township free of encumbrances and/or when the Township, Wellington County or Ministry of Transportation (MTO) requires land dedication for a road widening. When lands are to be dedicated to the Township, a Phase I/II Environmental Site Assessment must be completed in accordance with either CSA Standard Z768-01 or Schedule D of Ontario Regulation 153/04 (as amended from time to time) under the Environmental Protection Act. Depending on the findings of the Phase I ESA, a Phase II ESA and possible record of site

condition (RSC) may be required on the portion of the land that is to be dedicated to the Township, County or MTO in accordance with Ontario Regulation 153/04 (as amended from time to time). The Township Building Department may also require a RSC when a property is changing the land use through a Site Plan application, Building Permit, or completing a zone change. Under Ontario Regulation 153/04 (as amended from time to time), a RSC will be required if the proposed development will change the site to a more sensitive land use.

j) Archaeological Assessment

An Archaeological Assessment of the proposed development may be required from a licensed Archaeologist to conduct an assessment of the site, to ensure preservation or resource removal and documentation of any significant archaeological resources found on site.

k) Heritage Impact Assessments and Conservation Plan

As part of a complete application for the proposed development, the Subdivider may be required to submit a Heritage Impact Assessment and/or Conservation Plan, in accordance with the requirements of Heritage Planning staff and "Info Sheet #5 Heritage Impact Assessment and Conservation Plans" of the Ministry of Culture, Tourism and Sport Heritage Tool Kit, to the satisfaction of the Township and County planning staff.

l) Easements which are known to be required by the Township and such other legal and property matters as the Township may be aware of at the time.

A.5 Development Requirements

All developments requiring Municipal Servicing shall be undertaken and/or supervised by a Professional Engineer (Engineer) registered with the Professional Engineers of Ontario, or a Consulting Engineering firm authorized to practice in the Province of Ontario. All final drawings and relevant reports submitted to the Township shall bear the seal of the registered professional Engineer responsible for the design of the project. Drawings are to be 24" x 36" size and at a scale which is adequate to show sufficient detail of the proposed work.

The Engineer shall submit, in triplicate, copies of plans, specifications and pertinent design calculations for the proposed Municipal Services in accordance with the requirements of the Township. Plans shall also be provided in electronic format (pdf).

Where appropriate, the plans to be submitted shall include the following:

a) A copy of the plan for registration in the case of a subdivision or such other legal survey plan(s) as may be available; (only one copy of the legal plans are required).

b) General plan(s) of the project showing all municipal services;

c) Area grading plan showing all proposed road and lot drainage;

d) A storm sewer drainage and storm water management plan including the entire area to be drained;

e) A sanitary sewer drainage plan including the entire area to be serviced;

f) Plan and profile of all proposed streets and services;

g) Plans showing miscellaneous details, if required;

h) Landscape plan;

i) Sediment and erosion control plan;

j) Utility servicing plan/Composite utility plan, including Street light layout and lamination plan;

k) Such other plans as may be required for Site Plan/Subdivision Agreements.

A.6 Design Calculations

The design calculations shall include:

a) Storm sewer design sheet.

b) Stormwater Management Report (where applicable).

c) Sanitary sewer design sheet.

d) Design notes on pipe strengths and bedding requirements.

e) Detailed cost breakdown of all Municipal Services to be provided. Cost estimates shall be provided with final submission to enable the Township to monitor project costs.

A.7 Review of Plans and Specifications

The plans, specifications and other documentation submitted will be reviewed by the Township. One copy of information submitted will be returned to the Consulting Engineer noting any required revisions. All design and drawings to be in metric units.

A.8 Municipal Approval

When the plans, specifications and other design calculations are approved, the Township will sign as the municipality and/or applicant, all applications for submission to the appropriate regulatory agencies.

A.9 Commencement of Construction

No construction work related to the development shall begin until Township and other approval agencies approvals/permit requirements have been satisfied

A.10 Inspection of Construction and As Recorded Drawings

The Engineer or Consulting Engineering Firm responsible for the works shall be required to provide full-time inspection during construction. The Engineer shall also be responsible for the submission of AutoCAD (Release 2014 or later) and Adobe Acrobat PDF file drawings to make a complete set of “As Recorded” drawings, following the completion of the works. Drawings are to be 24” x 36” size sheet.

If items described in the tender drawings were constructed in variance to the designs illustrated in the approved proposed construction drawings, then the AAs Recorded@ submissions should be revised and/or edited to accurately reflect how the work in question was actually built. AAs Recorded@ drawings should also include: locations and inverts of sanitary and storm services; locations and elevations of water services.

A.11 Construction Maintenance Period

The Engineer or Consulting Engineering Firm responsible for the project will work with the Township in carrying out any appropriate inspection during the maintenance period. Full time inspection of all servicing components that will become property of the Township is required.

A.12 Operation and Connection of Municipal Services

No operation of or connection to, existing municipal services without prior written approval from the Township of Wellington North Public Works Department.

A.13 Additional Standards and Specifications

For items not specifically covered by the Municipal Standards, the minimum criteria to be used will be referenced in the Ontario Provincial Standard Drawings (OPSD), Ontario Provincial Standard Specifications (OPSS), Ministry of the Environment and Climate Change (MOECC), Ministry of Transportation (M.T.O.), or other recognized authority, and when conflicts arise, the Township's decision will be binding.

Where specific product or methodology is identified by the Municipal Standards, alternatives of similar or superior quality and performance will be considered at the sole and exclusive discretion of the Township.

B. PLAN AND DRAWING SPECIFICATIONS

The plans and drawings shall be prepared as follows:

B.1 General Plan

a) Minimum scale of 1:1000.

b) Indicate a north arrow and construction north arrow.

c) Show a title block.

d) All datum should be referred to a metric geodetic municipal benchmark.

e) Show all the existing and proposed lots, blocks, easements, road allowances and street names.

f) Show all existing and proposed curbs and sidewalks.

g) Show the direction of flow for all existing and proposed sewers and ditches

h) Show all existing and proposed sewer sizes, maintenance holes, catchbasins, and stormwater detention areas.

i) Show all existing and proposed watermain sizes including valves and hydrants.

j) Show all existing and proposed services and utilities, including street light pole locations, control pedestals and hydro transformer locations.

k) Show all existing structures, vegetation, natural features on, or adjacent to the subject property.

l) Show proposed phasing.

m) Show all abutting properties and land usage.

n) Show a table for a list of revisions.

B.2 Plan and Profile Drawings

The plan and profile drawings shall be prepared in accordance with the Standard Drawings, to the satisfaction of the Municipality, and as follows:

a) All plans and profiles must be drawn at a minimum scale of 1:500 horizontally and 1:50 vertically.

b) Indicate a north arrow.

c) Show a title block and key plan.

d) All elevations should be referred to a metric geodetic municipal benchmark.

e) Show all the existing and proposed lots, blocks, easements, road allowances and street names.

f) Show all existing and proposed curbs and sidewalks.

g) All existing basement elevations must be shown on the profile to determine flooding impacts.

h) Show all existing and proposed sewer and watermain lengths, types and class of pipe, type of pipe bedding, grades, sewer inverts and direction of flow, roadways and include all services on both plan and profile drawings.

i) Show all existing structures, vegetation, natural features on, or adjacent to the subject property.

j) Show dimensions and curb radii.

k) Where the plans are amended or revised after they have been approved by the Township Engineer, the date of amendment or revision shall be noted in the table for the list of revisions on the plan, and resubmitted to the Township Engineer.

B.3 Lot Grading Plans

See Section G.

C. SANITARY

C.1 Sanitary Sewers

Sanitary sewer design may be subject to Ministry of Environment and Climate Change review and approval. Discharge into the Township's sanitary sewer system must be as per the Township's current sewer-use by-law.

Sanitary sewer allocations may be requested by contacting the Township's Building Department.

Sanitary sewers with service connections to each lot or block shall be provided in accordance with the Ministry of the Environment and Climate Change Guidelines and the following Township of Wellington North design criteria.

a) All sanitary sewers shall be designed so that the hydraulic gradeline under peak flow condition is equal to or below the obvert of the pipe. Velocities shall be sufficient for self-cleaning in the mains. Low pressure systems will be considered when no gravity system is available – easements may be required.

b) Capacity: Manning's Formula (full flow)

c) Population:

- Based on Official Plan and Zoning By-Law maximum densities.
- Residential Maximum Densities from Official Plan or Zoning By-Law or other criteria as determined from capacities of existing trunk services and facilities.

d) Domestic Flows: 450 L/cap.d. (litres per capita per day)

e) Extraneous Flows: 0.15 L/ha.s. (litres per hectare per second)

f) Peaking Factor:

- Commercial peaking factor of 1.0
- Residential (Harmon Formula):

$$M = 1 + \frac{14}{4+Pop.^{0.5}}$$ (Max = 4.0 – MOECC guide lines)

- Industrial: To be in accordance with current Ministry of the Environment and Climate Change design criteria.

g) Minimum Velocity: 0.6 m/s based on actual flow

h) Maximum Velocity: 3 m/s

i) Pipe Roughness: Manning's "n" value 0.013 for concrete and PVC pipes.

j) Minimum Size:

- 200 mm (trunk or collector)
- 125 mm or match existing (residential services)
- 150 mm (industrial, commercial or multiple residential services)
- Decreases in pipe size from upstream to downstream will not be permitted.

k) Pipe Bedding: As detailed in Table 1

l) Pipe Materials: See Table 2

m) Minimum Depth of Cover: 2.4 m (Insulation to be provided if cover is below 1.5 m)

n) Location: In accordance with the Township of Wellington North typical road cross–sections. (see Standard Drawing R1)

o) Maintenance Hole Spacing: 100 m for pipes up to 1200 mm diameter

p) Maintenance Holes:

- Minimum of 1200 mm diameter or as manufacturer's specifications.
- Pre-benched structures to be used where possible.
- Approved "Kor-N-Seal" pipe adaptors shall be used for the connection of all pipes at maintenance holes.
- Drop Structure required where the inlet and outlet inverts differ by more than 0.6 m.

- Invert Drops: Determined by hydraulic calculations for all junction and transition maintenance holes.

  For all others:

0^o Turn	20 mm
10^o – 45^o Turn	50 mm
46^o – 90^o Turn	80 mm

- Waterproofing/Sealing: All external joints in precast concrete sanitary maintenance holes shall be wrapped with 150 mm Denso tape or approved equivalent.

q) Maintenance Hole Adjustment:

- Castings to be left at base asphalt elevations and adjusted to finished elevations prior to surface asphalt.
- Precast concrete adjustment units to be used.
- Minimum 150 mm adjustment allowance.
- Maximum 300 mm adjustment allowance.
- No brick, block or steel lift rings permitted.

r) Service Connections:

- Minimum Diameter: 125 mm or match existing
- Minimum Grade: 2%
- All connections to be made with an approved manufactured prefabricated “Tee” or approved equivalent unless connecting to an existing main, where stainless steel straps and saddles may be permitted.
- T-Y cleanout with PVC cap to be provided at Property Line below grade as required.
- For new development one (1) service per residential unit for singles, semis, row or block townhouses. See Standard Drawing S1 for service layout.
- For deep sanitary service connections exceeding 4.0 m connection at main will conform to Pipe Manufacturers Specifications (Installation Guide).

s) Closed Circuit T.V. (CCTV) Inspections:

- Closed Circuit T.V. (CCTV) inspections will be required at the following three (3) intervals:

  i) Prior to Preliminary Acceptance (after base asphalt and curb is placed), this also includes services to Property Line

  ii) As part of preparation to surface asphalt (main only)

  iii) As part of Final Acceptance (main only)

- Upon Completion of a connection to any Township sanitary sewer system, no sewage or liquid may be discharged into the system from the building serviced by the connection until a closed circuit television (CCTV) inspection of the pipe from the building to the Township's sewer main has been completed, in form and content and with functionality results satisfactory to and approved by the Township's Public Works Department or the Township's Building Department.

C.2 Sanitary Sewage Pumping Stations

Sanitary sewage pumping stations and discharge forcemains shall be designed in accordance with the latest edition of the Ministry of Environment and Climate Change design guidelines for sewage works. The design shall be completed by a Professional Engineer licensed in the Province of Ontario. A minimum of two sewage pumps (one duty and one standby) shall be provided each rated at the peak flow capacity of the station. When station peak flows exceed 100 L/s, three pumps shall be provided. One pump (jockey pump) shall be rated for the average day flow of the station and the other two pumps shall be rated for the peak flow of the station.

For stations with peak flow capacities of 100 L/s or less, the part of the structure housing the pumps may consist of a wet well only. When the peak flow capacity exceeds 100 L/s, the station configuration shall be wet well/dry well where the pumps are located in the dry well for easier maintenance.

All sewage pumps shall be rated as submersible and shall be manufactured by Flygt/Xylem. All pump installation accessories (anchor bolts, guiderail holders, chain hooks, lifting chain, etc.) shall be 316 stainless steel when available. Otherwise accessories shall be 304 stainless steel. Pump removal guiderails shall be galvanized steel (grade and diameter as per pump supplier's recommendations). The pump shall be supplied with a discharge/suction elbow supplied by the manufacturer for wet well and dry well installations respectively. Pumps shall be supplied with Flygt/Xylem seal monitoring systems for the model of pump selected. Pump motors shall be premium efficiency. Pump removal equipment shall be supplied by the pump supplier.

Risers from pumps shall not enter the bottom of the discharge header. Pump riser pipes shall enter the discharge header via a 45 degree wye connection. The pipe header shall include a valve near the wall of the chamber where the header exits the station, a 75 mm diameter drain complete with valve and a 150 mm diameter station by-pass/forcemain flushing connection complete with valve.

The station discharge shall be equipped with a magnetic flow meter either located in the dry well or in a separate chamber outside the wet well or dry well. Piping and valves for a meter bypass shall be provided. A sufficient number (minimum of 4) of bidirectional knife gate valves shall be installed to isolate the flow meter and the meter bypass. The meter shall be rated as explosion proof (Class 1, Division 1, Group D). In addition, the flow meter shall be rated for continuous/prolonged submersion (NEMA 6P) in water/sewage.

All piping used for conveying sewage, sump pump discharge and potable water shall be flanged Schedule 40S, 316L stainless steel. The stainless steel shall originate from a Canadian or an American mill. Mill reports shall be provided for all stainless steel piping. Piping 100 mm in diameter and larger shall be flanged.

Flange backing rings shall be hot dipped galvanized steel. All flanged connections shall be assembled with 316 stainless steel bolts, nuts, washers, etc. and all threads shall be treated with copper based anti-seize compound.

Check valves shall be Valmatic Surge Buster check valves with fusion bonded epoxy coating inside and out, 316 stainless steel cover bolts, disc accelerator, backflow actuator and EPDM reinforced disc.

All isolation valves for pump discharges and flow meters shall be stainless steel bi-directional knife gate valves. They shall be Dezurik KCB or Stafsjo. Valves shall be wafer style/semi-lug design, ANSI class 150, full port, two piece stainless steel body with a stainless steel super structure and standard gland packing. The 316 stainless steel, fully machined blade will have rounded edges and be fully guided to prevent blade movement causing stuffing box seal failure. The gland box shall be fully machined with radiused ends to match the round edges on blade. There will be a fully encapsulated seat of EPDM material which is field replaceable. The valve will be non-rising stem with a double lead acme screw thread which together with needle axial bearings assures ease of operation. All valves shall be operational from outside the wet well for wet well only configurations. Provide suitable operators for all isolation valves in wet wells and dry wells.

Dry wells shall be equipped with sewage sump pumps with a minimum discharge diameter of 75 mm. Dual check valves and a plug valve shall be installed on the sump pump discharge piping.

All stations shall include the installation of variable frequency drives manufactured by ABB Inc. Acceptable motor control centre (MCC) manufacturers are Eaton and Allan-Bradley. Variable frequency drives from the approved MCC manufacturers are not acceptable/approved.

All system programmable logic control (PLC) panels shall be manufactured by Allan-Bradley and shall be SCADA programmed using language that is the same as that used in other Township sewage facilities at the time of installation. The human machine interface shall have a colour touch screen that is 375 mm (15") wide. Program source code shall be provided to the Township.

Wet well stations shall be equipped with aluminum platforms inside the wet well for servicing equipment. Safety guardrail for the platforms shall be anodized aluminum with 150 mm high kick plates. Safety chains for the guardrail shall be stainless steel. All ladders shall be 316L stainless steel with a minimum 20 mm diameter anti-slip rungs. Ladder side rails shall be a minimum of 50 mm wide by 10 mm thick. All anchoring systems for platforms and ladders (drop-ins, bolts, nuts, washers, etc.) shall be 316 stainless steel. Minimum bolt diameter shall be 13 mm. Wet wells for stations that are wet well/dry well configurations shall include aluminium or fiberglass stairs complete with anodized aluminium or fiberglass handrail to allow easy access to the wet well for operating staff.

Wet well vents shall be 11 gauge, 304L stainless steel complete with stainless steel 24 mesh screen. Vent screens shall be removable with stainless steel fasteners.

Stations and flow metering chambers shall be equipped with access hatches. All access hatches shall be aluminum and rated for H20 loading. The man access hatches shall be 750 mm by 900 mm. Pump access hatches shall be sized based on pump dimensions. The manufacturer shall provide structural calculations stamped by a registered Professional Engineer in the Province of Ontario. The channel frame shall be a minimum ¼" aluminum with full anchor flange around the perimeter and have a minimum cross-sectional area of 7.5 square inches for proper water drainage. Covers shall be equipped with Type 316 stainless steel hinges having a minimum 3/8" diameter stainless steel pins and shall pivot so the cover does not protrude into the channel frame. Hinges shall be specifically designed for horizontal installation and shall be through bolted to the cover with tamperproof stainless steel lock bolts and shall be through bolted to the frame with stainless steel bolts and lock nuts. All bolts shall be flush with the covers' surface. Covers shall be equipped with compression springs fully enclosed in telescopic tubes. The upper tube shall be the outer tube to prevent accumulation of moisture, grit and debris inside the tube assembly. The lower tube shall interlock with a flanged support shoe fastened to a formed ¼" gusset support plate. Covers shall be fitted with the required number and size of compression spring operators to provide smooth, easy, controlled operation through the entire arc of opening and to act as a check in retarding downward motion when being closed. Operation shall not be affected by temperature. Covers shall be equipped with a stainless steel hold-open arm which automatically locks the cover in the open position. A conveniently located handle shall release the covers for closing. Each cover shall be equipped with a recessed padlock hasp covered by a hinged lid that is flush with the surface. Each cover shall have a lift handle that is designed to be flush with the walking surface when not in use. A 40 mm (1½") drain coupling shall be located in the right front corner of the channel frame. All hardware shall be for installation in a highly corrosive environment, Type 316 stainless steel. All fasteners shall be Type 316 stainless steel. Hardware to include spring tubes, springs, lifting mechanism supports, hold-open arms(s), hinges, hinge pins, safety chain (on double cover units) and lock assembly. The pump removal hatches shall permit the installation of submersible pump guide rail brackets. Provide safety access grates under all hatch covers. Ensure all access grates are hinged, equipped with retractable lifting handle, rated for and reinforced for a live load of 14.4 kN/m^2, equipped with lock mechanism which holds the grate at 90 degrees vertical. Provide aluminum safety grating. Grating shall be safety orange. Grating shall be powder coated, applied by electrostatic spray process. Coating shall be a thermosetting epoxy powder coat finish minimum 2 mm thick and baked at 180 degrees C until cured.

For wet well stations, the control building shall be offset from the wet well location. For wet well/dry well stations, the building shall be located above the dry well. The building shall be constructed of concrete masonry block with either brick or face block as the architectural finish of the exterior of the facility. The architectural finish shall be approved by the municipality. When the station is designed with a pitched roof, the roofing material shall be prepainted galvanized steel as manufactured by Indal Metals, Vic West Steel or Agway Metals Inc. The panel core thickness shall be a minimum of 26 gauge. Panels shall be long enough so that horizontal splices are not required. The nominal width of the panels shall be a minimum of 600 mm. Architectural louvers for the building shall be prepainted aluminum and be designed to attenuate noise to 70 dB at 7.0 m. Motorized dampers for the louvers shall be aluminium. For wet well/dry well configurations, provide lifting equipment to remove the pumps from the dry well that will allow the pumps to be removed to the outside of the building and loaded on to a truck.

Stations shall include the supply and installation of standby power diesel generators. The generator shall be sized to operate the entire electrical system of the station continuously plus 25% spare capacity for future loads. The fuel tank shall be integral with the generator complete with a double walled fuel tank with a capacity to operate the generator under full load for 72 hours. The generator shall be equipped with a hospital grade silencer. The acoustical design of the generator enclosure/building shall be a minimum of 70 dB at 7.0 m. The acoustic evaluation and design shall be completed by a Professional Engineer licensed in Ontario. The generator may be housed in the station control building or in an acoustically designed walk-in enclosure supplied by the generator manufacturer. Acceptable generator suppliers include: Toromont/Caterpillar, Cummins Eastern Canada, Kohler (Paramount Power Systems), Generac (Total Power Limited), Wajax Power Systems and GAL Power. The generator installation shall comply with all applicable regulations including but not limited to all requirements of the Technical Standards and Safety Authority (TSSA).

Discharge forcemains shall be designed by a Professional Engineer licensed in Ontario. Forcemain material shall be PVC pipe with a minimum pressure rating of 160 psi (SDR 26). Pipe strength, pressure rating and dimension ratio shall be determined through the completion of a transient analysis. The design of the forcemain shall also include the installation of pressure and vacuum relief valves in precast concrete chambers and one forcemain flushing connection for every 500 m of forcemain length. Relief valves shall be located where recommended by the transient analysis. Piping inside flushing and relief valve chambers shall be Schedule 40S stainless steel. Isolation valves shall be as specified above. Relief valves shall be stainless steel complete with flushing connections/attachments, shall be manufactured by ARI Valves and shall be suitable for use with wastewater. The forcemain shall be buried at a depth of 2.0 m, shall be white or purple in colour and shall be installed with tracer wire as specified for watermain.

The site shall be fenced with black vinyl covered galvanized wire (50 mm mesh No. 6 gauge) with 1.2 oz/ft^2 (366 g/m^2) of galvanizing on wire and barbed wire overhang pointing outward. Overall height shall be 2400 mm including the barbed wire projection.

The access road and interior of the site shall be paved.

The land development company shall provide Township staff with training on all equipment at the station and shall provide the municipality with an overall functional operating and maintenance manual along with manufacturer's operating and manuals for all equipment installed at the station.

D. STORM

D.1 Storm Drainage

Storm sewer system design may be subject to Ministry of Environment and Climate Change, Ministry of Transportation, Wellington County and Conservation Authority review and approval. Discharge into the Township's storm sewer system must be as per the Township's current sewer-use by-law.

At times, storm water design may utilize municipal or ward drains for outlets. In addition to other approvals, design that outlet to a municipal and ward drain are also subject to approval by the Township's drainage superintendent.

Township road ditches are not typically used for storm water outlets and their use is subject to Township review and approval.

Storm drainage systems including lot grading, catchbasins and piped outlets shall be designed with consideration being given to Major and Minor systems. Minor systems are to be conveyed to the receiver (stormwater management facility or watercourse) via sewers. Major flows are to be conveyed via overland routes.

The storm drainage system shall adhere to the Ministry of the Environment and Climate Change Guidelines and the following Township of Wellington North design criteria:

a) Rainfall Intensity: Ontario Ministry of Transportation (M.T.O.) Intensity Duration Frequency (IDF) curves.

b) Design Storm:

- Minor System: 1 in 5 year storm event for local sewers designs

  1 in 10 year storm event for high value commercial development downtown business and trunk collectors.

- Major System: Regional Storm expressed as "Hurricane Hazel" or 1 in 100 year storm event (whichever generates greater runoff values).

- Rural System: 1 in 25 year storm event for road culverts.

  1 in 10 year storm event for driveway culverts.

c) Rainfall Distribution: Developer to verify appropriate Authority for jurisdiction.

3 hour Chicago – Grand River Conservation Authority and Maitland Valley Conservation Authority. Type 2 – 6 hour SCS – Saugeen Valley Conservation Authority.

d) Runoff Coefficients: The drainage area shall include all lands which will outlet through one common system. The design shall take into consideration the eventual use of all the lands within the drainage area and assign the appropriate coefficient to the lands based on the designation in the Official Plan.

e) Inlet Time:

- Major System: Bransby Williams 10 minute minimum
- Minor System: Bransby Williams 10 minute minimum

f) Pipe Roughness:

- Manning's "n" value, 0.013 for concrete, and PVC pipes.
- Manning's "n" value, 0.024 for corrugated steel pipes.

g) Pipe Capacity:

- Sewers: Manning's Formula (full flow)
- Culverts: MTO Drainage Manual, Section 'D'

h) Pipe Materials: See Table 2.

i) Pipe Bedding: See Table 1.

j) Velocity:

- Minimum 0.75 m/s
- Maximum 4.5 m/s

k) Location: In accordance with the Township of Wellington North typical road cross–sections. (see Standard Drawing R1, R2, R3 and R4).

l) Maintenance Holes:

- Minimum of 1200 mm diameter or as manufacturer's specifications.
- 100 m for pipes up to 1200 mm diameter
- 150 m for pipes greater than 1200 mm diameter

m) Structure Pipe Connections: Brick, block and non-shrink grout shall be used for the connection of all pipes at structures.

n) Structure Adjustment:

- Castings to be left at final elevation with permanent concrete curb. Temporary drainage pipe required to drain water into basin until final asphalt placed.
- Precast concrete adjustment units to be used.
- Minimum 150 mm adjustment allowance.
- Maximum 300 mm adjustment allowance.
- No brick, block or steel lift rings permitted.

o) Catchbasin Spacing on Municipal Roads:

- 75 m maximum except at intersections where no surface drainage across intersecting streets will be permitted.
- Where gutter grade on a cul-de-sac is less than 2% then catchbasins shall be required in the cul-de-sac.

p) In-Line Drains and Rear Catchbasins:

- Surface inlets (catchbasin or inlet basin) are required every 2 units (townhouse or semis) along rear lot line swales. Singles will require full catchbasins for all structures. Surface inlets (catchbasin or inlet basin) are required every 3 units (singles) along rear lot line swales. Townhouses require a catchbasin at the lead from the road but inlet basins can be used thereafter.

- Sewer from the road the rear yard (i.e. on side yard) is to be a minimum of 300 mm diameter concrete pipe offset 0.5 m from the lot line situated on a 3 m easement divided equally on the side lot line.

- Sewers across the rear lot line to be offset 1 m from the lot line on a 3 m easement entirely on one lot.

- Sewers along the rear lot lines of townhouses are to be a minimum of 200 mm in diameter. Where the number of upstream inlets basins exceeds 2, the pipe size is to be increased to a minimum of 250 mm in diameter. These sewers along the rear can be PVC or HDPE.

- Sewers along the rear lot lines of singles are to be a minimum of 250 mm in diameter. Where the number of upstream catchbasins exceeds 1, the pipe size is to be increased to a minimum of 300 mm in diameter. These sewers along the rear can be PVC or HDPE.

q) Twin Inlet Catchbasins: Required at sag points.

r) Blind Connections: Not permitted to storm sewers under 900 mm diameter.

s) Storm Structure Sumps: Catchbasin maintenance holes are to have a 300 mm sump and catchbasins are to have a 600 mm sump.

t) Benching: Manholes and catchbasin manholes with pipes over 450 mm diameter require benching.

u) Minimum Cover: 1.2 meters

v) Minimum Size:

- 200 mm diameter where only lot services are connected for residential.

- 300 mm (trunk)

- Single CB leads 250 mm.

- Twin Inlet CB leads 300 mm.

- 400 mm diameter culvert.

w) Service Connections:

- Minimum size: 100 mm
- Minimum Grade 1%
- Minimum depth at Property Line 1.2 metres
- Services to be located 1.5 m minimum from side lot line, for singles locate on low side of lot. One service/residential unit for singles, semis, row or block townhouses. See Standard Drawing S1 for service layout.
- All lots to have service connection for foundation drain sump pumps. Gravity connections at building not permitted. See Standard Drawing S2.
- All connections to be made with an approved prefabricated tee.

x) Roof Drains: All roof drains shall discharge to the surface. Controlled on property and conveyed to a suitable outlet.

y) Storm Sewer Outlets: Suitable bank and stream bottom erosion protection must be provided, i.e. headwalls, rip rap, Corrugated Steel Pipe end section, etc.

z) Subdrain: 6 m – 150 mm diameter geotextile wrapped subdrain required upstream of all storm structures and in both directions at sags in the road profile. Additional subdrain as required by geotechnical consultants.

D.2 Stormwater Management Requirements

a) Quality Control: In accordance with "Stormwater Management Planning and Design Manual", March 2003 by the Ministry of Environment and Energy.

b) Quantity Control: Control of post-development runoff flows to pre-development levels for rainfall events with return periods between 5 and 100 years. Over-control may be required to satisfy downstream constraints.

c) All hazard lands, wetlands, Environmentally Sensitive Areas (ESAs), Area of Natural or Scientific Interests (ANSIs) and floodlines are to be identified on drawings

d) Facility configuration and landscaping to incorporate design recommendations outlines in the document entitled "Design Principles of Stormwater Management Facilities" (City of Guelph), August 1996. Developer to verify appropriate Authority for jurisdiction. A copy of the document is available upon request.

e) Sediment/Erosion Control: Detailed plan to be submitted for approval.

f) All Stormwater Management Facilities shall be subject to Class Environmental Assessment requirements.

g) Note: Other approval agencies may have additional requirements.

E. WATER WORKS

E.1 Water Supply System

Central water supply systems shall be designed in accordance with current Ministry of the Environment and Climate Change Design Guidelines for Drinking Water Systems (2008), as amended from time to time, and all applicable Regulations. All materials used for the municipal drinking water system shall meet all applicable American Water Works Association (AWWA) and National Sanitation Foundation (NSF) standards. All fittings associated with the water supply system shall meet NSF 372 requirements for lead content.

The pre-servicing report shall address the requirements for water supply to service the Development. Should the existing supply system not have sufficient capacity to provide for new development, the Developer=s Engineer shall provide a Hydrogeological Report commenting on proposed sources for additional water supply and how any impacts on the existing ground water regime will be mitigated.

Fire flow protection and storage provisions shall be reviewed with the Township of Wellington North for each development during the initial stages of Draft Plan Approval. Any expansions to the existing water systems, together with the requirements for additional wells, storage facilities and/or trunk mains will be resolved at that time.

Where the development is not connected to an existing municipal system and a communal water supply is proposed, two wells will be required. Where connections are to be made to an existing municipal system, the capacity of existing wells and storage facilities will be considered when reviewing the requirements for new source wells and storage facilities. All water supply systems shall incorporate provisions for standby power, metering, chlorination, fire storage, precharged tanks to buffer the well pumps and security fencing of the site.

Note:

Developments outside the areas designated by Council as requiring municipal water supply systems may be approved on the basis of individual wells and sewage disposal systems. The specific requirements for central water systems in rural areas shall be reviewed with Council on submission of the Preliminary Draft Plan.

E.2 Watermains

Developer's Engineer must comply with the requirements of the Ontario Safe Drinking Water Act and all applicable regulations made in accordance to the act, including but not limited to the Drinking Water Works Permits (DWWP) and the Municipal Drinking Water License (MDWL). DWWP and MDWL are available from the Township's Water Department and it is the responsibility of the developer's engineer to obtain copies as necessary.

Watermains with services to each lot or block shall be provided in accordance with the Ministry of the Environment and Climate Change Design Guidelines for Drinking Water System and the following Township of Wellington North Public Works Department design criteria based on PVC C900 Class 235 (DR18) CSA B137.3 pipe:

a)	Capacity:	Hazen-Williams formula in accordance with current Ministry of the Environment and Climate Change design criteria.
b)	Population:	See Section C – Sanitary Sewers.
c)	Design Flow:	Greater of Maximum Daily Demand plus Fire Flow or peak demand flow.
d)	Average Day:	450 L/cap.d. (litres per capita per day)
e)	Peaking Factor:	In accordance with current Ministry of the Environment and Climate Change design criteria.
f)	Minimum Size:	150 mm diameter mains.
g)	Minimum Depth of Cover:	2.0 metres for mains and services.
h)	Location:	In accordance with the Township of Wellington North typical road cross-sections. (see Standard Drawing R1, R2, R3 and R4).
i)	Material:	See Table 2.
j)	Pipe Bedding:	As detailed in Table 1.

k) Tracer Wire:

- All watermain and services shall be installed with tracer wire.
- #12 AWG Copper Clad Steel. High Strength with minimum 450 lb. break load and minimum 30 mil HDPE insulation thickness suitable for direct burial and colour coded blue.
- Direct bury wire connectors shall include 3-way lockable connectors and mainline to lateral lug connectors specifically manufactured for use in underground trace wire installations. Connectors shall be dielectric silicon filled to seal out moisture and corrosion. Non-locking friction fit, twist or taped connectors are prohibited.
- Above ground tracer wire shall be attached to storz pumper connection of fire hydrants.
- Conductivity testing will be required on all new tracer wires.

l) Fittings: Ductile Iron, mechanical joint, AWWA C110 approved, pressure rating 1035 kPa.

m) Valves:

- Same number of valves as the number of streets at an intersection with valves located at extension of property line of intersecting street.
- Maximum 200 m spacing on straight runs.
- Maximum 250 m spacing on trunk lines.
- Chambers will be required for all valves over 300 mm diameter (OPSD-701.010)
- If valves exceed 1.5 m in depth – valve nut extensions are required.

n) Valve Type: See Table 2.

o) Valve Boxes: See Table 2 and Standard Drawing W2.

p) Hydrants:

- See Table 2.
- All hydrants to be Red with black Storz cap.
- Valves to be 1.2 m from hydrant.

q) Hydrant Spacing: 150 m maximum.

r) Services:

- Minimum 25 mm diameter services or match existing, whichever is greater.
- Minimum 25 mm diameter services for industrial, commercial or multiple residential.
- All services to be Type “K” copper pipe unless otherwise approved by the Township of Wellington North Public Works Department. Crosslinked polyethylene (“Municipex” by Rehau and “Blue904” by Ipex) may be considered for services over 20 m in length.
- 75 mm diameter PVC sleeves are required where curb stops are located in driveways.
- Temporary plastic blow-off pipes are required for all unconnected services.
- See Table 2.

s) Anodes:

- DZP-24, 10.9 kg shall be installed on all connections to existing iron watermain.
- DZP-12, 5.4 kg shall be installed on all iron fittings, valves etc.
- Zinc nuts are permitted where larger anodes are not practical.

t) Mechanical Joint Restraints:

- "Grip Ring" Pipe Restrainer manufactured by Romac Industries Inc.
- Uni-Flange Series 1300 manufactured by Ford Meter Box Company Inc.
- Megalug Series 2000 PV for PVC C900 pipe
- PVC Stargrip Series 4000 Restrainers manufactured by Star Pipe Products.

u) Water Sampling Stations: Sampling stations shall be Eclipse #88WC on a pedestal as manufactured by the Kupferle Foundry Company. The number and location of water sampling locations shall be reviewed and approved by the Township.

v) Details not included in above notes are shown on the Township of Wellington North Standard Drawings.

w) The Developer's contractor shall not operate any valve or hydrant on the existing water distribution system. Operation of valves and hydrants on the municipal system shall only be undertaken by certified municipal staff.

x) Grounding of hydro services to the municipal water system is prohibited.

E.3 Watermain Testing Procedures:

a) Temporary watermain connection shall be as follows:

i) No new watermain shall be connected to an existing watermain until all testing procedures have been completed and approved by the Township of Wellington North Public Works Department.

ii) The new watermain shall be kept isolated from the existing waterworks system using a physical separation until satisfactory microbiological testing has been completed and accepted by the municipality. Water required to fill the new main for hydrostatic pressure testing, disinfection and flushing shall be supplied through a temporary connection between the existing water system and the new main (refer to Standard Drawing W4 and W5). The temporary connection shall include an appropriate and approved cross-connection control device (reduced pressure zone backflow preventer). Public Works Department will require written certification of the backflow preventer operation in accordance with CAN/Canadian Standards Association – B64.5 Series Manual and/or AWWA C510.

iii) At the beginning of each new watermain installation, a minimum of two (2) swabs shall be installed. Swabbing of the new watermain shall be completed prior to hydrostatic testing.

b) Hydrostatic Testing (Reference OPSS 441.07.24):

i) Hydrostatic testing shall be conducted under the supervision of the Township of Wellington North Public Works Department upon completion of the watermain including services and backfilling.

ii) A test section shall be either a section between valves or the completed watermain.

iii) Test pressure shall be 1035kPa.

iv) The test section shall be filled slowly with water and all air shall be removed from the pipeline. A twenty-four (24) hour absorption period may be allowed before starting the test. The test section shall be subjected to the specified continuous test pressure for two (2) hours.

v) The leakage is the amount of water added to the test section to maintain the specified test pressure for the test duration. The measured leakage shall be compared with the allowable leakage as calculated for the test section. The allowable leakage is 0.082 litres

per millimeter of pipe diameter per kilometer of watermain for a two (2) hour test period.

vi) If the measured leakage exceeds the allowable leakage, all leaks shall be located and repaired and the test section shall be retested until a satisfactory result is obtained.

vii) Watermain Pressure Test Form shall be completed for all installations. Form is as shown on Page No. 38.

c) Flushing and Disinfecting Watermains (Reference OPSS 441.07.25):

i) Flushing and disinfecting operations shall be conducted under the supervision of the Township of Wellington North Public Works Department. The Public Works shall be notified at least two (2) business days in advance of the proposed date on which flushing and disinfecting operations are to commence.

ii) Liquid chlorine solution shall be introduced so that the chlorine is distributed throughout the section being disinfected. The chlorine shall be applied so that the chlorine concentration is at an acceptable concentration (refer to Table 1 – below) throughout the section. The system shall be left with the chlorine solution for twenty-four (24) hours.

TABLE 1:
CHLORINE CONCENTRATION AND CONTACT TIMES FOR NEW WATERMAINS

Disinfection Method	Minimum Contact Time	Initial Chlorine Concentration	Maximum Allowable Decrease in Chlorine Concentration
Tablet or Continuous Feed	24 hours	≥ 25 mg/L	40% of Initial Chlorine Concentration to a Maximum of 50 mg/L

Example 1:

When using the continuous feed method of chlorination with an initial chlorine concentration of 50 mg/L, the maximum allowable decrease in chlorine concentration is 40% of 50 mg/L, or 20 mg/L. Therefore at least 30 mg/L of chlorine must be present after 24 hours.

Example 2:

When using the continuous feed method of chlorination with an initial chlorine concentration of 150 mg/L, the maximum allowable decrease in chlorine concentration is 50 mg/L, because 50% of 150 mg/L is greater than the maximum allowable decrease of 50 mg/L. Therefore, at least 100 mg/L of chlorine must be present after 24 hours.

The Township of Wellington North Public Works Department may consider alterative chlorine concentration and contact times on an individual basis.

iii) Sampling and testing for chlorine residual will be carried out by the Township of Wellington North Public Works Department. The chlorine residual will be tested in the section after twenty-four (24) hours. If tests indicate an acceptable decrease in chlorine concentration, the section shall be flushed completely and recharged with water normal to the operation of the system. If the test does not meet the requirements, the chlorination procedure shall be repeated until satisfactory results are obtained.

iv) Watermain shall be flushed in a sequence approved by the Township of Wellington North Public Works Department. The Public Works may permit or require the flushing to be carried out in stages as sections of the system are completed. Flushed sections shall be protected from contamination.

v) The Contractor shall provide acceptable equipment and chemical additives to dechlorinate the water that must be wasted. Chlorinated water discharged to the sanitary sewer shall be discharged at such a low flow rate or dechlorinated prior to discharge so that there is no possibility of chlorine residual remaining in the waste water when it reaches the waste water treatment plant. Total residual chlorine in water discharged into storm sewers, drainage ditches or watercourses shall not exceed 2 ug/L.

vi) Recharge the watermain with Municipal water and flush via a 20 mm maximum diameter pipe for twenty-four (24) hours.

vii) After final flushing and before the watermain is approved for connection of the new main to the existing water system, two (2) consecutive sets of water samples, taken at least twenty-four (24) hours apart, shall be collected, every 350 metres, plus from the end of the line and from each branch. Certified staff form the Public Works Department shall collect for bacteriological samples.

viii) All water samples will be taken in accordance with the most current ANSI/AWWA Standard C651, collected by the Township of Wellington North Public Works Department and analyzed by a certified laboratory. Two (2) – 200 ml microbiological sample (bottles supplied by the Township – ONLY) must be obtained at each location. The sample form is to be filled out requesting for E.coli, Total Coliforms and HPC is to include the samplers name. Each sample collected must include a 'Total and Free Chlorine residual' reading.

ix) The Township will pay Laboratory expenses for the initial first set of sampling required for microbiological results. If the disinfection fails to produce satisfactory samples, disinfection and testing shall be repeated at the contractor's expense including water usage until satisfactory samples have been obtained.

x) The Township of Wellington North minimum requirements for acceptability of microbiological tests are:

E-coli Coliform	0 CFU/100 ml
Total Coliform	0 CFU/100 ml
HPC	not greater than 500 CFU/ml

d) Commissioning of New Main

i) When all of the tests including the microbiological samples are satisfactory, written approval from the Public Works Department for the main to be connected to the existing water system must be obtained.

ii) All new piping and appurtenances placed in the connection of the new main and existing waterworks system must be disinfected with a 1% solution of sodium hypochlorite or equivalent method.

iii) The system shall not be put into operation until clearance has been given by the Township of Wellington North Public Works Department.

Township of Wellington North

Watermain Pressure Test Form

(To Be Completed For All New Installations)

Project: _____ Contract No: _____

Area: _____ Date: _____

Contractor: _____

Required Test Pressure: _____

Pipe Material: _____

Diameter (mm): _____

Length Tested: _____

Allowable Leakage in litres = 0.082 x _____ Dia. (mm) x _____ Length (m) FOR 2 HOURS
*(**OPSS 441.07.24.03**)* *1000*

Minimum time test required (hours): _____

Maximum volume loss allowed for (hours): _____ (litres): _____

Actual period of time the main was under pressure (hours): _____

Actual measured volume loss (litres): _____

Test Results: Satisfactory ❒ Unsatisfactory ❒

Comments:

Public Work's Signature	Contractor's Signature	Inspector's Signature

SAMPLE

F. ROADWAYS

F.1 Roadway Design

Roadway design and driveway entrance may be subject to Ministry of Transportation or Wellington County review and approval**.**

The following Township of Wellington North Road design criteria for residential roads applies to local and minor collector streets:

Standard Road Section:

The residential roadway section is shown on Standard Drawing R1, R2 and R3. This section designates standard locations for all Municipal Services and other utilities.

Geometric Standards:

- Streets with 20 m, 22 m and 26 m Right-of-Ways will have a minimum pavement width of 8.5 m, 9.5 m and 14.0 m respectively. This width does not include the concrete gutter.

- The minimum pavement radii for intersections shall be 10.0 m and 16.8 m on a cul-de-sac with an island and 13.0 m on a cul-de-sac without an island (permanent or temporary).

- The minimum property radius on a cul-de-sac shall be 20.0 m.

Rural Road Section:

The rural road section is shown on Standard Drawing R4. In the case of rural roads located away from urban centres and mainly used by local traffic, the Township will consider for local development, reducing the rural standards to match existing conditions of roads in that specific area. The minimum gravel surface width for consideration would be 7.3 m.

The following standards are to be followed, however, specific conditions may warrant some change. Any change will require approval from the Township of Wellington North.

a) Minimum Grade: To maintain 0.50% minimum on gutter grade.

b) Maximum Grade: 8.0%

c) Vertical Curves: Vertical curves to effect gradual change between tangent grades are to be used in accordance with the MTO Geometric Design Standards.

d) Horizontal Curves: Use in accordance with the MTO Geometric Design Standards.

e) Cross Fall: 2%

f) Asphalt Depth:

- 90 mm Minimum (50 mm HL 4 & 40 mm HL 3 compacted) on Local Residential.
- 100 mm Minimum (60 mm HL 4 & 40 mm HL 3 compacted) on Collector & Arterial.
- 50 mm HL 4 on temporary cul-de-sac or temporary access roads and local rural.

g) Granular Depth: Depending on soil conditions and a geotechnical report, but no less than:

- 150 mm Granular “A”
- 450 mm Granular “B”

F.2 Curb and Gutter

a) Concrete curb and gutter shall be constructed on both side of all streets in accordance with Table 1 and Standard Drawing R1, R2, R3 and as follows:

- Mountable curb to be used on local residential internal streets.
- Barrier curb to be used on collector and external streets.

b) Driveway cuts shall not be made until after building foundation is constructed. All cuts shall be mechanically cut in accordance with specifications approved by the Township of Wellington North.

Driveway ramps between back of curb and sidewalk and sidewalk and Property Line or where there is no sidewalk shall be paved with 50 mm Hot Mix Asphalt HL 3 (modified fine) compacted to property line.

F.3 Sidewalks

Concrete sidewalks 1.5 m wide shall be provided on one side of residential and both sides of collector and arterial streets and one side on residential local streets. Ramps shall be provided at all intersections with curb. Minimum 125 mm Granular “A” base and 125 mm thickness of concrete. Expansion joint material is to be bituminous impregnated fibreboard.

F.4 Walkways

Pedestrian walkways shall be concrete, 1.8 m wide with 1.5 m minimum height galvanized chain link fence on each side within property limits. Minimum Right-of-Way width is to be 6.0 m. Bollards are to be installed 1.1 m either side of centre of walkway, at both ends of the walkway. Bollards are to be 150 mm x 150 mm x 2.4 m pressure treated wood exposed and buried 1.2 m.

Minimum Right-of-Way to be increased to minimum 9.0 m where servicing and walkway exist through same corridor.

F.5 Boulevards

All boulevards shall be graded, topsoiled with a minimum depth of 200 mm, and sodded from the property line to the back of curb.

Asphalt boulevard to be used for boulevards less than 1.0 m in width.

F.6 Traffic Control and Street Name Signs

a) At each intersection there shall be erected an approved double unit street name sign. The signs and posts will be provided by the Municipality at the Developer’s expense.

b) Traffic signs and posts will be provided by the Municipality at the Developer’s expense, following the passing of the By-Law for their installation.

F.7 Daylighting Triangle

Minimum 7.5 m by 7.5 m daylighting triangle required on local road intersection corners. Minimum 9.0 m by 9.0 m daylighting triangle required on collector road intersection corners. Additional size may be required for special circumstances. Daylight triangles are to be part of municipal right-of-way.

F.8 Easements

a) Minimum 6.0 m easements required for single municipal mainline services, minimum 9.0 m easements required for two (2) municipal mainline services. Where more than two (2) services are to be accommodated by an easement consult with the Township for specific easement requirements.

The Township of Wellington North Standard Drawings which apply to road construction are included and/or referenced in this Manual.

G. LOT GRADING

G.1 Plan Requirements

Lot grading plans shall be prepared in accordance with the Standard Drawing G1, to the satisfaction of the Township, and as follows:

a) Lot grading plans must be drawn at a minimum scale of 1:500.

b) Indicate a north arrow.

c) Show a title block

d) All elevations should be referenced to a metric geodetic municipal benchmark.

e) Show all existing and proposed lot numbers and blocks.

f) Show all proposed rear lot catchbasins, pipes, swales, top of grate elevations and inverts and easements.

g) Show a table for a list of revisions.

h) Show existing contours (maximum 0.5 m intervals).

i) Show existing and proposed elevations at lot corners.

j) Show adjacent topography and drainage patterns.

k) Show all existing structures, vegetation, natural features on, or adjacent to the subject property.

l) Indicate specified house grade, top of foundation elevations, steps in foundation, low openings and garage floor elevations including proposed driveway grade.

m) Show proposed road grades and elevations on all streets with arrows indicating direction of slope.

n) Show proposed elevations along boundary of all blocks abutting single family and semi-detached lots in the subdivision.

o) The approval of a drainage plan is related to drainage only. It is the responsibility of the developer to ensure that the drainage plan compliments the land and suits the houses to be constructed.

p) Show all temporary erosion control measures to be in place during the construction period and permanent erosion control works to be left in place after construction.

q) The maximum side slopes on swales should be 3 horizontal to 1 vertical. All swales must have a minimum depth of 150 mm. Swales within the development are to be centred on property lines. Swales abutting other properties are to be constructed entirely within development lands.

r) The maximum slope of all embankments should be 3:1. Where grades greater than 3:1 are proposed a retaining wall should be constructed. All 3:1 or steeper are to be indicated on the plan, clearly defining the limits of the slope.

s) The proposed direction of overland flow shall be indicated on the plans by arrows. High points and all changes in grade are to be clearly noted on the plan, with spot elevations.

t) The Township Engineer may require details of all terracing and slope treatment and in depth cross-sections to be provided, with the lot grading plan.

u) All Regional Flood and Fill Lines, verified by the Conservation Authority, must be indicated on lot grading plans where developments are adjacent to existing watercourses.

v) Topsoil shall be stripped in all cut and fill areas and stockpiled for reuse during final lot grading operations. Site specific exceptions may be applicable at the discretion of the Township.

w) Multiple unit blocks are subject to approval through the site plan approval process, individual site plan agreements are required for each block.

G.2 Drainage Plan Requirements

The Drainage Plan shall indicate the proposed grading of all the lands to be developed and how all the lands adjacent to the subdivision which drain through the property are to be provided for.

H. UTILITIES AND STREET LIGHTING

All hydro, telephone and other utilities shall be underground and placed in accordance with current local utility company regulations and standards. Provide Composite Utility Plan to the Township for review.

Satisfactory evidence that the Developer has entered into an agreement providing for the installation of underground hydro and street lighting must be submitted to the Township of Wellington North prior to the execution of a Subdivision Agreement.

All developments shall be provided with street lighting in accordance with the current requirements of the local utility companies and the Township of Wellington North.

All materials and installation shall meet or exceed current OPSS standards and the requirements of the local utility supplier. The materials and supplier shall be reviewed with the Township prior to approval and samples shall be supplied if requested.

All utility installations within the Municipal right-of-ways are required to obtain a Municipal Consent Approval from the Township. Prior to issuance of Municipal Consent the following is required:

- Composite Utility Plan (CUP) is to be prepared and submitted to the Township for review and approval. The CUP is to reflect all utilities to be installed within the municipal right-of-ways.

- All utility agencies must review and approve the CUP with respect to their specific utility in the context of the CUP (i.e. Sign-offs).

- Submission to Township to include CUP, original utility plans and agency Sign-offs.

Discussion with utilities will occur regarding placement of utilities in the boulevard, specifically natural gas routing around hydro transformer locations. Refer to Standard Drawing U1.

H.1 Street Lighting Design

Lighting designs (light levels, uniformity ratios, etc.) shall be based on the latest version of American National Standards Institute/Illuminating Engineering Society of North America's American National Standard Practice for Roadway Lighting; (ANSI/IESNA RP-8 latest revision).

Roadway lighting must provide uniform lighting at a level that is adequate and comfortable for vehicular and pedestrian movement on the roads and sidewalks.

All roadway lighting systems shall be designed by an Engineer experienced in roadway lighting. Designs shall be carried out using the luminance method as described in RP-8 (latest revision) (unless noted otherwise) by a qualified engineer, while incorporating the Township standards and specifications as given below. Design calculations with photo metric layouts shall be prepared by utilizing one of the following approved lighting and design programs: AGI 32 and Autolux.

As per the current roadway lighting policy, all proposed lighting shall be reviewed and approved by the Township. Lighting design submissions to the Township must include:

- Photometric distribution diagram
- design criteria used
- design calculations
- contract drawings and specifications
- manufacturers literature

All roadway lighting design and construction must satisfy Electrical Safety Authority (ESA) requirements, and is subject to ESA inspection and approval. All materials used for roadway lighting must meet Canadian Standards Association (CSA) specifications.

H.2 Material Specifications

All roadway lighting equipment used must meet the Township's roadway lighting standards and specifications. It shall be the responsibility of the street lighting contractor to ensure they have the latest revisions of the Township's street lighting specifications and list of approved suppliers prior to ordering any materials. All street lighting components are to be manufactured in accordance with the Township's requirements as amended from time to time.

Unless otherwise indicated, all electrical materials shall be new and of uniform pattern throughout the work and ESA shall approve all materials, components or completed assemblies of components.

a) Street Light Poles:

Street light poles shall be concrete. Height of poles shall be determined by lighting system designers. For "cobra head" combinations, the pole shall be Class B centrifugally cast round concrete pole and have a mold finish. For decorative combinations, the pole shall be centrifugally cast concrete. Developers shall submit manufacturer's literature for the proposed standard and decorative poles to the municipality for approval. All poles must meet CSA specifications and are subject to Electrical Safety Authority (ESA) inspection and approval.

b) Luminaires:

All luminaires shall be light emitting diode (LED) lamps and shall come complete with a bird stop. Luminaires must meet CSA and electrical code requirements and are subject to ESA inspection and approval. The luminaires shall be manufactured by Phillips or LED Roadway Lighting. The style and design of the fixtures shall be submitted to the municipality for approval.

c) Brackets:

All street light brackets must meet CSA specifications and are subject to ESA inspection and approval. Standard street light brackets for use with "cobra head" luminaires shall be manufactured in accordance with the latest revisions of ANSI C136.1. Brackets shall be a 1.8 m or 2.4 m tapered elliptical aluminum bracket as needed for the lighting design. Decorative street light brackets shall be manufactured in accordance with the latest revisions of ANSI C136.1 with the changes necessary to apply to arms for decorative fixtures. Decorative brackets shall be 1.5 m or 1.8 m nominal curved bracket. The style and design of the bracket shall be submitted to the municipality for approval.

d) Photo-Electric Controllers:

Photo-electric controllers shall be suitable for use with LED fixtures. Controllers shall be electronic twist lock with the following features:

- A filtered (human eye spectral response) silicon light sensor with infrared blocking filter;
- MOV surge protection;
- Rated for 120 volts;
- Load rating: 1000 watts, 1800vA ballast;
- Turn on level at 1.5 FC and turn off at 1.5 times turn on;
- Operating temperature range from -40ºC to 70ºC

Photo-electric controllers must be manufactured using non-hazardous materials.

All photo-electrical controllers must meet CSA specifications and are subject to ESA inspection and approval.

e) Loadcentres:

The Township requires the ESA mandated disconnect for street lighting systems. The disconnect shall be provided by means of a service entrance rated loadcentre (pedestal type for underground systems and pole-mounted units for overhead systems) with stainless steel weather proof enclosure (minimum NEMA 4X rated) and complete with:

- 60 amp, 22 kAIC, 120 V / 240 V double-pole line side main breaker, and
- 40 amp, 120 V single-pole load side breakers (quantity: up to 6)

f) Street Lighting Cable Duct:

Street light cable duct shall be 50 mm (2") Type II PVC, direct buried duct meeting CAN/CSA-C22.2 NO.227.1 (latest revision). All ducts must meet CSA specifications and are subject to ESA inspection and approval.

g) Street Light Wiring from the Handhole to the Luminaire:

Street light wiring from the handhole to the luminaire shall be 2 - #12 copper NMWU plus 1 - #12 copper ground, CSA approved.

h) Street Lighting Distribution Cable from Loadcentre to Street Light Poles:

The street light cable from the loadcentre to the pole and from pole to pole shall consist of the following:

- 2 - #6 copper, RWU-90-CSA complete with 1 - #6 jacketed green ground (for 120V);

- 3 - #6 copper, RWU-90-CSA complete with 1 - #6 jacketed green ground (for 240V)

Cable shall be CSA approved.

i) Street Light Power Cable from Transformer to Loadcentre:

The street light supply cable feed from the transformer to the street light loadcentre shall be 3 - #2 copper RWU-90-CSA with 1 - #2 ground. Cable shall be CSA approved.

j) Grounding Rods and Plates:

Ground rods shall be solid steel, 19 mm diameter, 3 m long, copper clad for the full length and shall be according to CSA C22.2 No. 41.

Ground plates shall present not less than 0.2 m² of surface to exterior soil and be not less than 6 mm thick as per the Electrical Code. The plates shall be made of hot dip galvanized solid steel. Steel shall be according to CAN/CSA G40.20/G40.21, Grade 230G and shall be galvanized according to CAN/CSA G164.

The number of grounding rods and grounding plates shall be determined by the lighting system design engineer.

H.3 Electrical Drawings

The electrical layout drawings are a schematic representation of the requirements. All equipment shall be installed in locations detailed in the contract.

H.4 IES Illumination and Luminance Design Criteria

The illuminance method of roadway lighting calculations determines the amount or quality of light incident on the roadway surface and the luminance method of roadway lighting calculations determines how 'bright' the road is by determining the amount of light reflected from the pavement in the direction of the driver. Design criteria shall be in accordance with the requirements of ANSI/IES RP-8 (latest revision).

H.5 Lighting for Intersections

The luminance method is difficult to use with the design of lighting for intersections due to the basic assumptions inherent in luminance design and the methods used in its calculation. Therefore illuminance criteria and calculations are recommended for use in the design of intersections. Intersections should be illuminated to a level equal to the sum of the recommended average illumination levels for each of the intersecting roads. Refer to Table 8 in ANSI/IES RP-8-14 as amended.

At a minimum, all lane changes (additions or subtractions), left or right turn lanes, median islands, etc. should be adequately illuminated and are recommended to be included in the illumination design calculations.

Typical lighting layouts for intersections are given in ANSI/IES RP-8 (latest revision) and in the Transportation Association of Canada's (TAC) "Intersections Lighting", (latest revision).

H.6 Light Trespass

The basic light trespass requirements as per the current acceptable practice, the vertical illuminance values should be limited to a maximum of 3.0 lux at a height of 1.5 m above finished grade along the property line.

H.7 Road/Entrance Crossings

The street lighting ducts shall be heavy wall PVC or polyethylene duct with a minimum cover of 1200 mm under roadways and all commercial and industrial driveways. The ducts shall be installed in accordance with the requirements of the Township of Wellington North. Where a road crossing is required on a project that does not include road reconstruction, it shall be installed via a trench less method.

H.8 Walkways, Pathways and Trails

Requirements for the lighting of walkways, pathways and trails for a specific project are to be confirmed in consultation with the Township. Quality and quantity of light is to meet Illumination Engineering Society (IES) standards for the specific application. Lighting design is to ensure light trespass onto adjacent properties or into adjacent areas that are to be kept dark at night time achieve basic light trespass requirements as per the current acceptable practice. Note: This section is not applicable to sidewalks within road right-of-ways, which are to be addressed as part of the street lighting design.

H.9 Installation

a) General

The contractor shall ensure that the construction and installation of the street lighting system will be completed in a good and workmanlike manner and in accordance with Township standards.

Street lights shall be located on the boulevard in accordance with the Township's standard cross sections and as shown on the CUP, trenching plans and typical road sections while maintaining proper clearances from fire hydrants, driveways, transformer and switching units and trees or any other services.

The street lighting power supply is to be supplied to each street light loadcentre in accordance with ESA requirements.

The entire street light installation is subject to inspection and approval by the ESA. The contractor is responsible for applying and obtaining said inspection. Hydro One or Wellington North Power Inc. shall make the

connections inside the transformer once the following steps have been fulfilled:

- Approval has been given by the ESA, and a Connection Authorization has been received by Hydro One or Wellington North Power Inc. The Township requires a copy of the ESA authorization.

- The contractor has arranged for a Megger testing of the system, and a copy of the successful test report has been submitted to the Township. The developer has sent a request for connection letter to Hydro One or Wellington North Power Inc.

Hydro One or Wellington North Power Inc. shall notify the Township and the Developer once the street light system connection at the transformer has been completed. The Township shall then energize the street light system at the loadcentre and inspect the system operation. Any deficiencies shall be reported by the Township to the contractor for rectification.

b) Cable

Street light cables shall be installed in conformity with Township standards. The cable shall be installed in 50 mm (2”) Type II PVC, direct buried duct with a minimum of 600 mm cover. As per the Electrical Code, a 6” wide red plastic warning tape is to be installed with black lettering stating ‘ELECTRIC LINE BURIED BELOW”. This warning tape is required to be installed midway between the topmost conductor and final grade above all conductors within the trench.

Where the street light poles are not in place at the time of the cable installation, the end of the cable shall be coiled and staked at the intended pole location in a similar manner to the secondary service cables except that at least 3 m of cable shall be left above grade. Where the cable is to continue on to another light, the cable shall be looped and not cut and at least 6 m in total shall be left above grade.

Cables are to be inserted into the poles via the cable access ports and the ground wire shall be connected to the internal ground lug at the hand hole by means of a #6 AWG compression connector lug.

All connections to ground and to the luminaire conductors are to be made at the hand hole and taped or otherwise insulated after installation.

All connections inside the transformer shall be made by Hydro One or Wellington North Power Inc.

c) Street Light Cable Duct

In general, the ducts shall be placed in accordance with applicable Ontario Provincial Standard Specifications (OPSS) and Drawings (OPSD) for underground electrical distribution systems. In general, the street light duct shall be placed in the common trench on the same level as the secondary and/or communication cables, and on the road side of the trench, with a minimum of 600 mm cover.

When street light ducts are placed under driveways, the top 300 mm of the backfill shall be compacted to 100% Standard Proctor Density with granular “A”.

Street light duct placed under roadways shall be installed in accordance with OPSD 2100.06.

A ¼” Polypropylene fish rope is to be pulled into each duct.

d) Poles

Installation of street light poles are to be in accordance with applicable OPSD Series 2200 (Foundation) drawings and the manufacturer’s requirements.

In general, poles are to be installed in augured or vectored (high pressure water evacuation method) holes to the depths given in the above referenced drawings. The bottom of the hole must be cleaned of loose material before placing the pole.

The Contractor shall take care to ensure that no damage occurs to the electrical or street lighting system or other utilities during the installation of street light poles.

e) Luminaires, Brackets and Photo Controllers

Installation of street light luminaires and brackets shall be in accordance with the manufacturer’s requirements.

The photo-electric controller shall be positioned to face north.

The contractor shall take care to ensure that no damage occurs to the pole, luminaire, bracket or wiring during their assembly and erection.

f) Grounding

A minimum of two (2) rods must be installed adjacent to the street light loadcentre pedestal/pole, at least 0.3 m below final grade and connected to the bonded neutral block of the service entrance and must be spaced

no less than 3 m apart in accordance with the Electrical Code requirements.

Alternatively, a ground plate must be installed adjacent to the street light loadcentre pedestal/pole at least 0.6 m below final grade level and connected to the bonded neutral block of the service entrance.

A ground rod/plate shall also be installed at the last street light pole of every circuit and bonded to the pole's internal ground. The number of ground rods/plates for each street lighting circuit shall be determined by the design engineer.

Either system is acceptable providing the installation conforms to the Electrical Code requirements.

I. LANDSCAPING

I.1 Boulevards

All boulevards shall have a minimum depth of 200 mm topsoil plus sod.

I.2 Parks

a) All parks shall have a minimum depth of 200 mm topsoil, seed and mulch.

b) Seed mix shall be as follows:

TYPE	AMOUNT
Nu Blue Kentucky Bluegrass	25%
Baren Kentucky Bluegrass	25%
Herald Creeping Red Fescue	15%
Wilma Chewing Fescue	10%
Pinnacle Turf Type Per Rye	25%

c) Seed shall be applied at a rate of 1.5 – 1.7 kg/100 square metres.

d) All topsoil shall be in conformance with OPSS 802.

I.3 Trees

a) Trees shall be planted in front of every lot on Private Property at a location 300 mm from the street Property Line or maximum spacing of 25 m.

b) On corner lots a tree shall be planted every 15 m on Private Property the adjacent side yard on the flanking street.

c) Trees are to be planted so as not to interfere with other street functions or services when the tree matures. Where it is not possible to conform with the foregoing, the trees shall be planted at locations approved by the Municipality.

d) Planting of trees shall be as detailed on Standard Drawing L1 and L2. They shall be watered at time of planting and every two (2) weeks thereafter up to the expiration of the guarantee period. The guarantee period shall be one (1) year from the date of planting and the period for planting shall be Spring and Fall only.

e) All trees shall be No. 1 nursery stock, 2.5 m minimum height with a minimum caliper of 60 mm measured 300 mm above ground level.

f) All areas for planting shall be stabilized with sod or seed as required, prior to planting of trees.

I.4 Species

a) Alternate species shall be provided on all streets. A species list shall be provided and approved for each street, prior to any planting.

b) The species that are approved for planting on Municipal property shall include the following:

- Acer Nigrum — Black Maple
- Acer Rubrum — Red Maple
- Acer Saccharum — Sugar Maple
- Aesculus Hippocastanum — Common Horse Chestnut
- Phellodendron Amurense — Amur Cork Tree
- Celtis Occidentalis — Common Hackberry

c) The following species are suitable for downtown areas:

- Pyrus Calleryana — Chanticleer Pear, Redspire Pear
- Amelanchier Canadensis — Serviceberry
- Quercus Robur “Fastigiata” — Pyramidal English Oak

I.5 Park and Recreational Areas

The Township may request that the Park or Recreation Areas dedicated for the development be provided with a suitable entrance and graded and seeded so that they are suitable for recreational use.

The area to be dedicated for park use shall be reviewed with the Township on submission of the Preliminary Draft Plan. Requirements for entrances, services, fencing, grading and seeding will be finalized at time of engineering drawing review. The Township may also request that a different area then that proposed by the Developer be set aside for a park due to the physical features of site.

I.5 Fencing

Fencing shall be installed where there are varying land uses on adjacent properties. The following is applicable;

a) Black Vinyl Chain Link Fencing

- Fencing is to be 1.5 metre high, located 0.1 metres on Township property.
- Required along rear or side yards adjacent to public property, including open space, walkways, parkland, SWM blocks, utility corridors and servicing blocks.
- Adjacent to school properties the fencing requirements of properties abutting school board lands requires consultation with the local school board.
- All chain link fencing to be installed as per OPSD 972.130 and OPSS772.
- Gates are not permitted in required fencing.

b) Privacy Fencing

- Fencing is to be 1.8 m high wood board-on-board privacy fence, located on the property line.
- Required between residential and industrial/commercial/institutional properties. Also required along residential flankages and/ or rear yards which abut collector and arterial roads.
- Gates are not permitted in required fencing.
- Fencing is not required where acoustic barriers are to be installed.

c) Highway Wire Fencing

- Must be installed with 150mm (6 in.) diameter wood posts with wire fencing (OPSD 971.101)
- Required between private lands and natural heritage features; between private lands and agricultural lands.
- May also be required between public lands and natural heritage features; public lands and agricultural lands. This to be determined on a site specific basis at the Town's discretion.
- Gates are not permitted in required fencing.

J. REVISIONS TO SERVICING STANDARDS

J.1 Revisions

Since the Design Criteria and Standard Drawings could be revised, the Consulting Engineer should ensure that their Manual is up-to-date before commencing design work on a specific project. Copies of the current Standards can be obtained at the Township of Wellington North or on the Township of Wellington North website.

2. STANDARD DRAWINGS

Where the Ontario Provincial Standard Drawing No. has been indicated, this Standard shall apply. Where a Township of Wellington North Standard Drawing No. has been indicated in addition to the Ontario Provincial Standard Drawing No., the latter shall be read in conjunction with the Township of Wellington North Standard. Should there be an inconsistency between the Standards; the Township of Wellington North Standard shall take precedence.

The Township of Wellington North reserves the right to update its Standards from time to time and any person using them should ensure they have a copy of the current listing prior to proceeding with a project.

In all cases, the latest revisions of the Standard Drawings as of the date the design is completed shall be used. For the Township of Wellington North Standards, the Standard number includes the month and year of the latest revision of the Standard.

TABLE 1: STANDARD DRAWINGS LIST

TITLE	ONTARIO PROVINCIAL STANDARD DRAWING	TOWNSHIP OF WELLINGTON NORTH STANDARD	REVISIONS & UPDATES
Pipe Bedding-Granular 'A' Cover Material-Granular 'A' or sand	802.010 802.013 802.030 802.031 802.032 802.033		Rev. 3 Nov '14 Rev. 3 Nov '14 Rev. 3 Nov '15 Rev. 3 Nov '15 Rev. 3 Nov '15 Rev. 3 Nov '15
M.H. Frame and Cover a) Standard – Sanitary b) Standard – Storm c) Watertight – Sanitary	 401.010 (Type 'A') 401.010 (Type 'B') 401.030	 - - -	 Rev. 3 Nov '13 Rev. 3 Nov '13 Rev. 3 Nov '13
Catchbasin Frame and Grate	400.110	-	Rev. 2 Nov '13
Ditch Inlet Catchbasin Frame and Grate	403.010	Special where required	Rev. 2 Nov '13
M.H. Steps	405.010 (Circular Aluminum)	-	Rev. 3 Nov '13
Safety Platform, Aluminum	404.020	-	Rev. 3 Nov '13
Sewer Service Connections	1006.010	-	Rev. 3 Nov '16
M.H. (precast)	Section 700	-	
Catchbasin (precast)	Section 700	-	
Catchbasin M.H. (precast)	Section 700	-	
M.H. Benching	701.021	-	Rev. 4 Nov '14
Internal Drop Structure for Ex. M.H.	1003.030	-	Rev. 4 Nov '16
Water Service	1104.010 1104.020	-	Rev. 3 Nov '13 Rev. 2 Nov '13
25 mm Blow Off Installation	-	W1	
Valve and Box	-	W2	Rev. 2 Jan '17
Hydrant Setting	1105.010	-	Rev. 2 Nov '13
Connection of New Watermain to Existing Watermain	-	W3, W4	
Thrust Blocks	1103.010 1103.020	-	Rev. 2 Nov '13 Rev. 3 Nov '13
20 m Right-of-Way	-	R1	Rev. 2 Oct '16
22 m Right-of-Way	-	R2	
26 m Right-of-Way	-	R3	
Typical Rural Section	-	R4	Rev. 1 Oct '16
Concrete Sidewalk (125 mm Concrete) (125 mm Granular "A" minimum)	310.010	-	Rev. 2 Nov '15

Sidewalk Ramps	310.030 310.033	-	Rev. 1 Nov ‘15 Nov ‘15
Tactile Warning Plates	310.039	-	Nov ‘15
Barrier Curb and Gutter	600.040	-	Rev. 2 Nov ‘12
Mountable Curb and Gutter	600.100	-	Rev. 2 Nov ‘12
Asphalt Gutter	601.010	-	Rev. 2 Nov ‘13
Chain Link Fence	972.130	-	
Highway Wire Fence	971.101	-	
Lot Grading Detail	-	G1	Rev. 1 Aug ‘04
Servicing Layout	-	S1	
Sump Pump/Storm Connection	-	S2	
Sanitary Service Connection		S3	
Sanitary Connection ≥ 4m Deep	-	S4	
Deciduous Tree Planting Detail	-	L1	
Bare Root Tree Planting Detail	-	L2	
Utility Plan	-	U1	

STANDARD DRAWINGS – SEE APPENDIX

3. APPROVED MATERIALS AND PRODUCT LIST

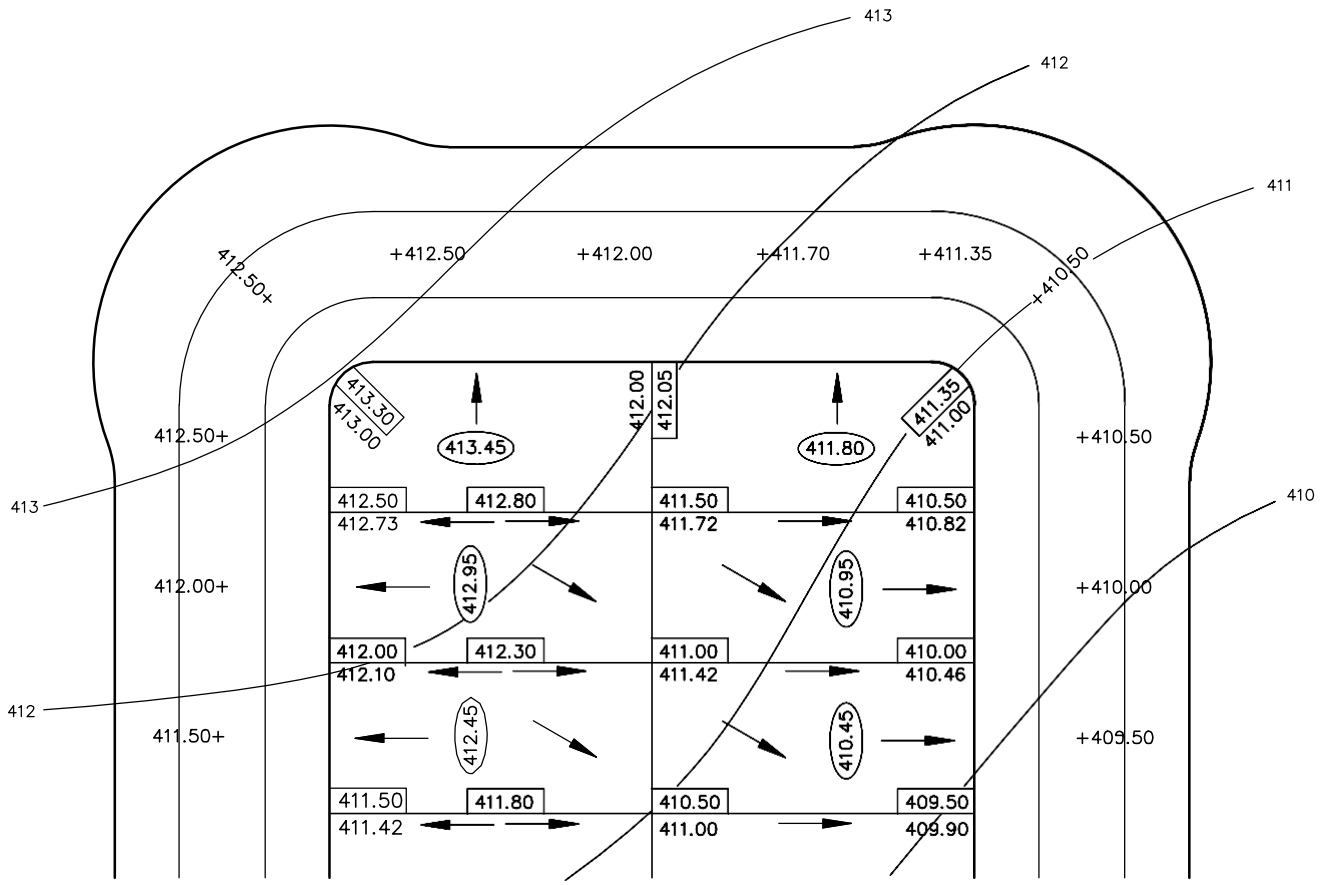
TABLE 2: APPROVED MATERIAL AND PRODUCT LIST

SERVICE	ITEM	APPROVED PRODUCT
SANITARY	Sewer Pipe	PVC DR 35 Concrete CSA #A257.1/A257.2
	Service Pipe	PVC DR 28
	Connections	Kor-N-Seal (Manholes) prefab tees or Kor-N-Tee (Services)
STORM	Sewer Pipe	375 mm diameter or less: PVC DR 35 - PVC pipe "Ultra Rib" as manufactured by IPEX, in accordance with CSA B182.4 - Concrete - CSA A257.2 (reinforced) - HDPE Boss 2000, 320 kPa stiffness c/w Ultra Stab 75 Joint as manufactured by Armtec, in accordance with CSA B182.8-02 Storm Sewer Grade. Pipe and fittings must bear CSA logo - PVC pipe, "KORFLO" as manufactured by Royal Pipe Company, in accordance with CSA B182.4 450 mm diameter or greater - Concrete - CSA A257.2 (reinforced) Leads to rear yard catchbasins are to be concrete All culverts must be galvanized CSP, minimum 1.6 mm thickness
	Service Pipe	PVC DR 28
	Connections	Kor-N-Seal (PVC) Adaptor with sand (ribbed) prefab tee or Kor-N-Tee (services)
WATER	Watermain	PVC pipe DR 18, Class 235 PVC and conform to ASTM D1784, AWWA Standard C900 and CSA Standard CAN3-B137.3-M86.
	Valves	Mueller Resilient Wedge Gate Valve AWWA C-509, mechanical joint with: - fusion-bonded epoxy coating - bronze stem - open counter clockwise Clow Resilient Wedge Valve AWWA C-509, F-6100 mechanical joint with: - fusion-bonded epoxy coating - bronze stem - open counter clockwise

WATER … cont'd	Hydrants	Canada Valve, Century Type Compression with "Storz" pumper connection (as manufactured by Mueller) open counter clockwise Clow Canada, Brigadier Series M-67-B with "Storz" pumper connection (as manufactured by Clow Canada) open counter clockwise
	Corporation Stop	Cambridge Brass, Ball Style, Series 301NL(no-lead), AWWA x CB assembly or Mueller Canada, Mueller Ground Key Design Type, H-15008N (no-lead), Mueller 110 Compression Joint
	Curb Stop	Cambridge Brass, Ball Style, Series 202NL (no-lead), CB Compression x CB Compression assembly or Mueller Canada, Mueller Mark II Oriseal, Type H-15209N (no-lead), Mueller 110 Compression Joint.
	Saddle	Robar Stainless Steel 2616 Double Bolt, Wide Band
	Mechanical Joint Restraints	- "Grip Ring" pipe Restrainer manufactured by Romac Industries Inc. - Uni-Flange Series 1300 manufactured by Ford Meter Box Company Inc. - 'Megalug Series 2000 PV for PVC C900 pipe - PVC Stargrip Series 4000 Restrainers manufactured by Star Pipe Products
	Tracer Wire	12 gauge, 7 strand copper with plastic coating. Attached to storz pumper connection
	Water Service Material	Copper seamless Type "K" Services greater than 20 m Crosslinked polyethylene ("Municipex" by Rehau and "Blue904" by Ipex) may be considered.

Material List Updated – March 2017

APPENDIX



LEGEND

412.73	EXISTING LOT CORNER ELEV.
412	EXISTING CONTOURS @ 1m OR LESS
+410.50	PROPOSED ℄ ROAD ELEV. @ 20m STA.
411.45	PROPOSED LOT CORNER ELEV.
→	PROPOSED SURFACE DRAINAGE & DIRECTION
411.95	PROPOSED GRADE @ BUILDING

REQUIRMENTS

DRIVEWAY GRADES 1% – 6%

WALKWAY GRADES 2% – 6%

LOT GRADES 2% – 6%

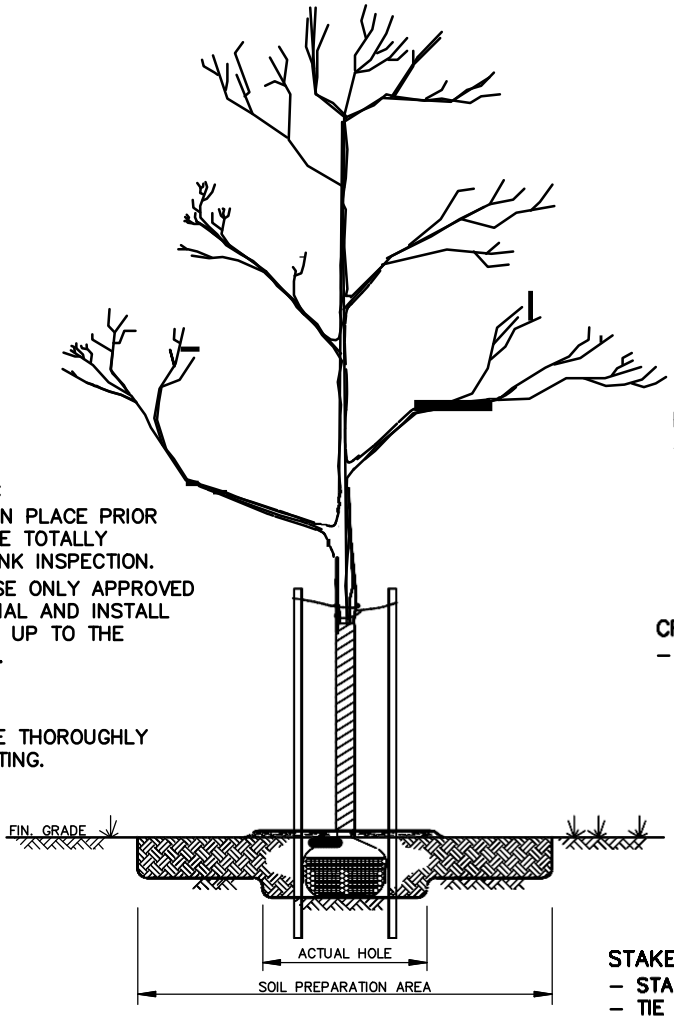
BUILDING GRADE 450mm HIGHER THAN HIGHEST FRONT LOT CORNER

ALL SIDE & REAR YARD SWALES TO BE ON LOT LINES, MIN. GRADE 2%, MIN. DEPTH 150mm, MAX. SLOPE 3:1

MAX. DISTANCE WITHOUT CATCHBASIN TO BE 75m.

TOP OF FOUNDATION ELEV. TO BE MIN. 150mm HIGHER THAN PROPOSED GRADES AT BUILDING

TOWNSHIP OF WELLINGTON NORTH	DATE AUGUST, 2004	REV. 1
LOT GRADING PLAN GENERAL	STD. **G1**	



SOIL AMENDENT:
- EXISTING TOPSOIL TO BE AMENDED WITH TRIPLE-MIX WHERE REQUIRED.

PLANTING SOIL:
- HOLE TO BE BACKFILLED AND CONCURRENTLY TAMPED AND WATERED TO ELIMINATE AIR POCKETS.

PLANTING DEPTH:
- IN HEAVY CLAY OR POORLY DRAINED SOIL, ALL WOODY PLANTS TO BE PLACED SO THAT THE ROOT COLLAR IS POSITIONED 75-100mm HIGHER THAN SURROUNDING GRADE.

TRUNK PROTECTION:
- TRUNK WRAPPING IN PLACE PRIOR TO PLANTING TO BE TOTALLY REMOVED FOR TRUNK INSPECTION.
- WHEN REQUIRED USE ONLY APPROVED TREE WRAP MATERIAL AND INSTALL FROM THE GROUND UP TO THE LOWEST BRANCHES.

WATERING:
- ENSURE TREES ARE THOROUGHLY WATERED AT PLANTING.

CROWN PRUNING:
- PRUNE AT PLANTING TO CAREFULLY REMOVE DEAD, BROKEN, DAMAGED & INTERFERING BRANCHES, DOUBLE LEADERS & NARROW ANGLE BRANCH UNIONS. THIN HEAD WHEN & WHERE APPLICABLE.

MULCHING:
- MULCH WITH SHREDDED BARK OR COMPOSTED HARDWOOD CHIPS TO A MAXIMUM DEPTH OF 75mm, OVER AN AREA OF THE ROOTBALL. KEEP MULCH 150mm AWAY FROM TRUNK.
- FOR OTHER TYPES OF MULCHING, REFER TO SPECIFICATIONS.

PLANTING AREA:
- ACTUAL HOLE TO BE 300mm WIDER AROUND PERIMETER OF ROOTBALL.
- SOIL PREPARATION AREA TO BE 5X ROOTBALL DIAMETER.
- SCARIFY SOIL PREPARATION TO A DEPTH OF 300mm FOR AERATION.

STAKES AND TIES:
- STAKE IMMEDIATELY.
- TIE USING BIODEGRADEABLE MATERIAL SUCH AS FOLDED BURLAP, ETC.
- STAKES TO BE PLACED TO PREVENT DAMAGE TO ADJACENT BRANCHES.
- USE 50mm x 50mm x 2m WOOD STAKES OR METAL T-BARS DRIVEN SECURELY INTO GROUND. ALIGN STAKES WITH PREVAILING WINDS.
- APPLY RODENT PROTECTION WHERE REQUIRED.

ROOTBALL, BURLAP, TWINE:
- CUT AND REMOVE ALL WIRE, ROPE, BURLAP AND TWINE FROM AROUND TRUNK AND THE TOP 1/3 OF THE ROOTBALL.

IMPORTANT:
SOME OR ALL NOTES MAY NOT APPLY TO THE SPECIAL REQUIREMENTS OF A SPECIES OR A PLANTING ENVIRONMENT.

BACKGROUND INFORMATION PROVIDED FROM LANDSCAPE ONTARIO.

TOWNSHIP OF WELLINGTON NORTH	DATE NOVEMBER, 2000	REV. 0
DECIDUOUS TREE PLANTING DETAIL	STD. **L1**	

SOIL AMENDENT:
- EXISTING TOPSOIL TO BE AMENDED WITH TRIPLE-MIX WHERE REQUIRED.

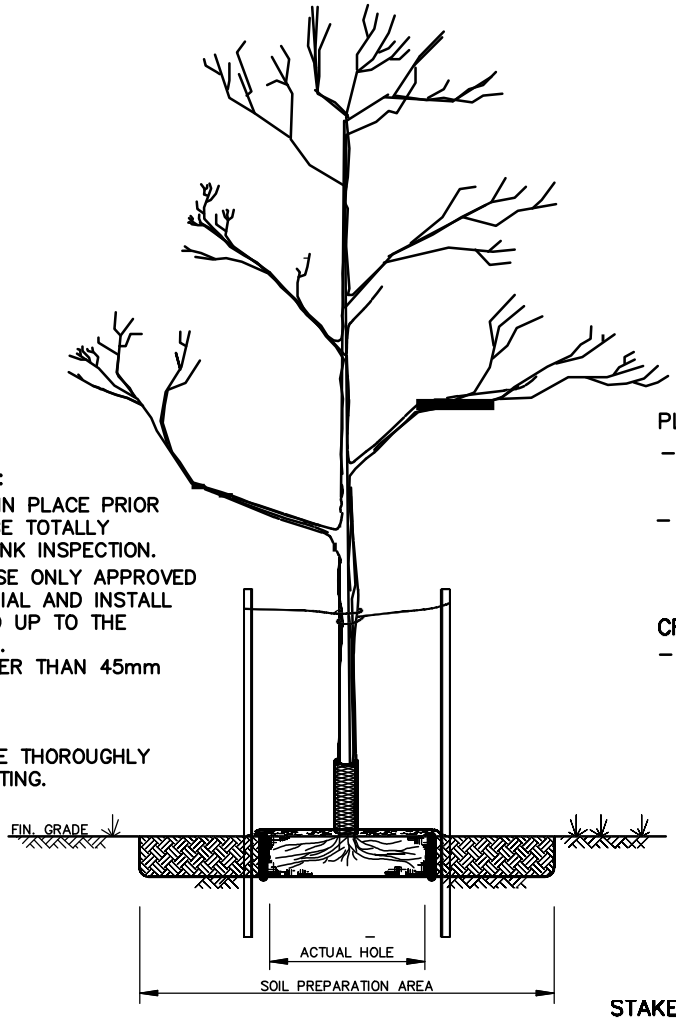
PLANTING SOIL:
- HOLE TO BE BACKFILLED AND CONCURRENTLY TAMPED AND WATERED TO ELIMINATE AIR POCKETS.

PLANTING DEPTH:
- PLANT TO BE PLACED SO THAT THE ROOT COLLAR IS POSITIONED AT THE SAME LEVEL AS IN THE NURSERY FIELD
- CARE SHOULD BE TAKEN TO AVOID EXCESSIVE SETTLEMENT OF ROOTS FOLLOWING PLANTING.

CROWN PRUNING:
- PRUNE AT PLANTING TO CAREFULLY REMOVE DEAD, BROKEN, DAMAGED & INTERFERING BRANCHES, DOUBLE LEADERS & NARROW ANGLE BRANCH UNIONS. THIN HEAD WHEN & WHERE APPLICABLE.

TRUNK PROTECTION:
- TRUNK WRAPPING IN PLACE PRIOR TO PLANTING TO BE TOTALLY REMOVED FOR TRUNK INSPECTION.
- WHEN REQUIRED USE ONLY APPROVED TREE WRAP MATERIAL AND INSTALL FROM THE GROUND UP TO THE LOWEST BRANCHES.
- WRAP TREES LARGER THAN 45mm CALIBER.

WATERING:
- ENSURE TREES ARE THOROUGHLY WATERED AT PLANTING.



MULCHING:
- MULCH WITH SHREDDED BARK OR COMPOSTED HARDWOOD CHIPS TO A MAXIMUM DEPTH OF 75mm, OVER AN AREA OF THE ROOTBALL. KEEP MULCH 150mm AWAY FROM TRUNK.
- FOR OTHER TYPES OF MULCHING, REFER TO SPECIFICATIONS.

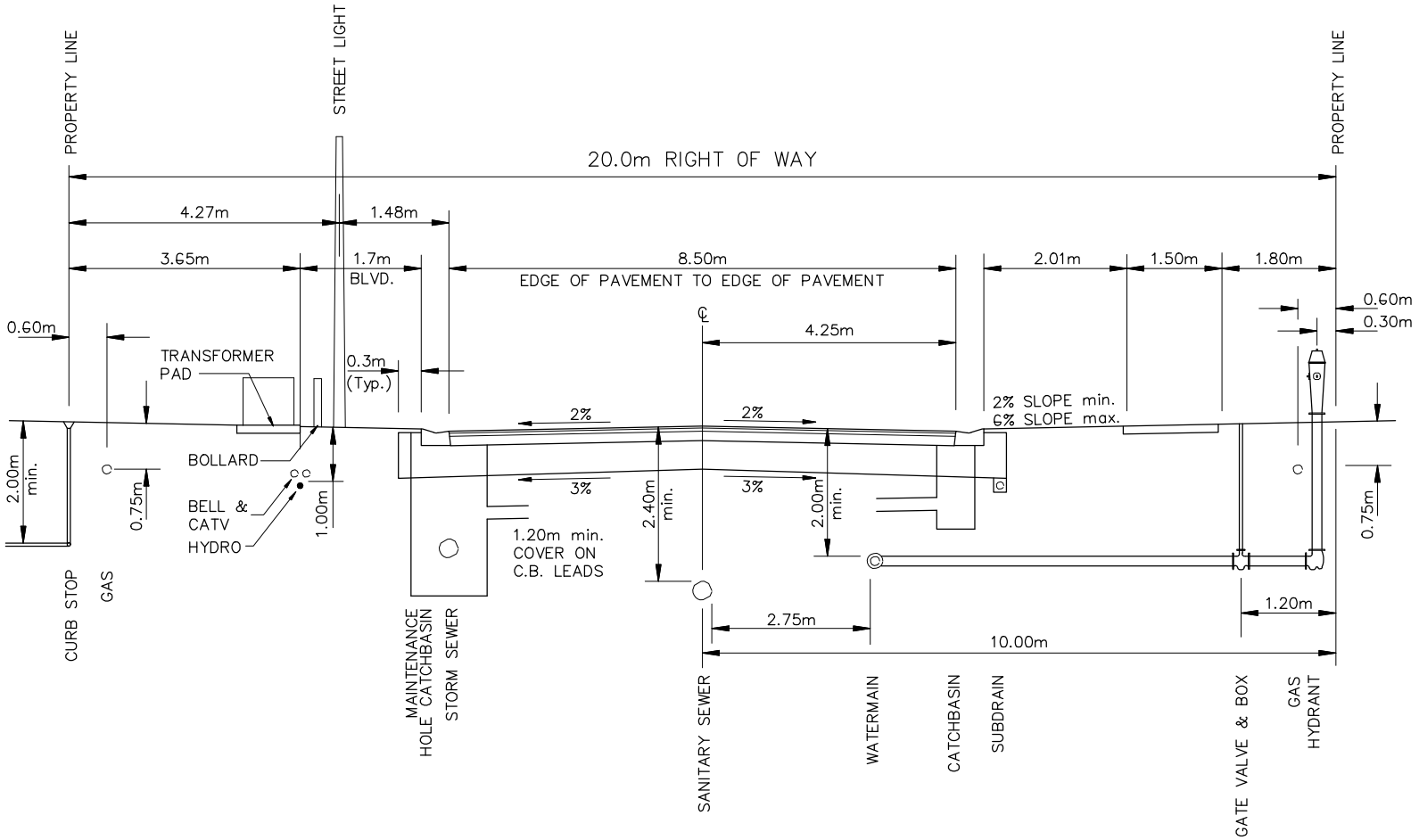
PLANTING AREA:
- ACTUAL HOLE TO BE 300mm WIDER AROUND PERIMETER OF ROOT SYSTEM.
- SOIL PREPARATION AREA TO BE 5X ROOT DIAMETER.
- SCARIFY SOIL PREPARATION TO A DEPTH OF 300mm FOR AERATION.

STAKES AND TIES:
- STAKE BEFORE PLANTING.
- TIE USING BIODEGRADEABLE MATERIAL SUCH AS FOLDED BURLAP, ETC.
- STAKE TO BE PLACED TO PREVENT DAMAGE TO ADJACENT BRANCHES.
- USE 50mm x 50mm x 2m WOOD STAKE OR METAL T-BAR DRIVEN SECURELY INTO GROUND. ALIGN STAKE WITH PREVAILING WINDS.
- APPLY RODENT PROTECTION WHERE REQUIRED.

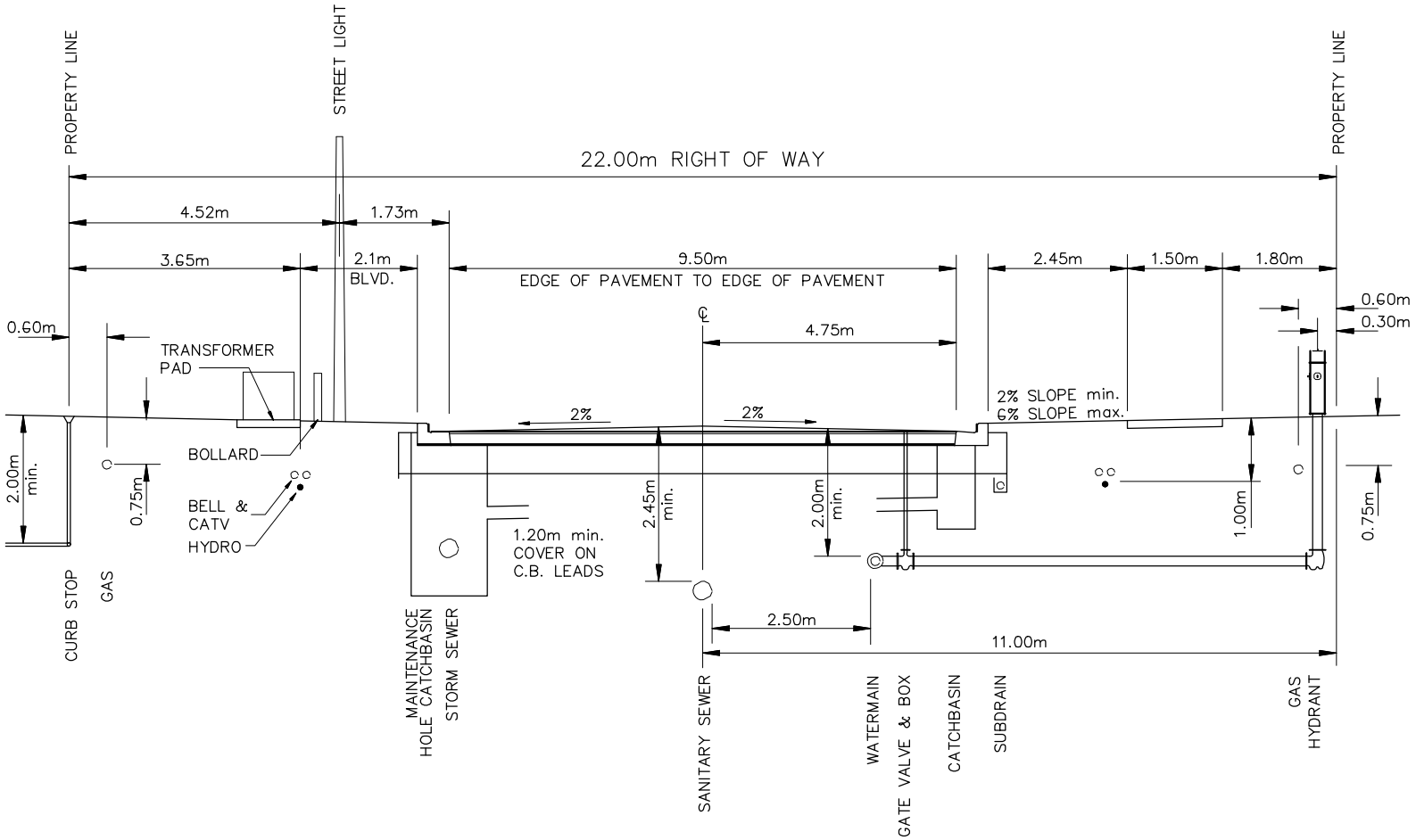
IMPORTANT:
SOME OR ALL NOTES MAY NOT APPLY TO THE SPECIAL REQUIREMENTS OF A SPECIES OR A PLANTING ENVIRONMENT.

BACKGROUND INFORMATION PROVIDED FROM LANDSCAPE ONTARIO.

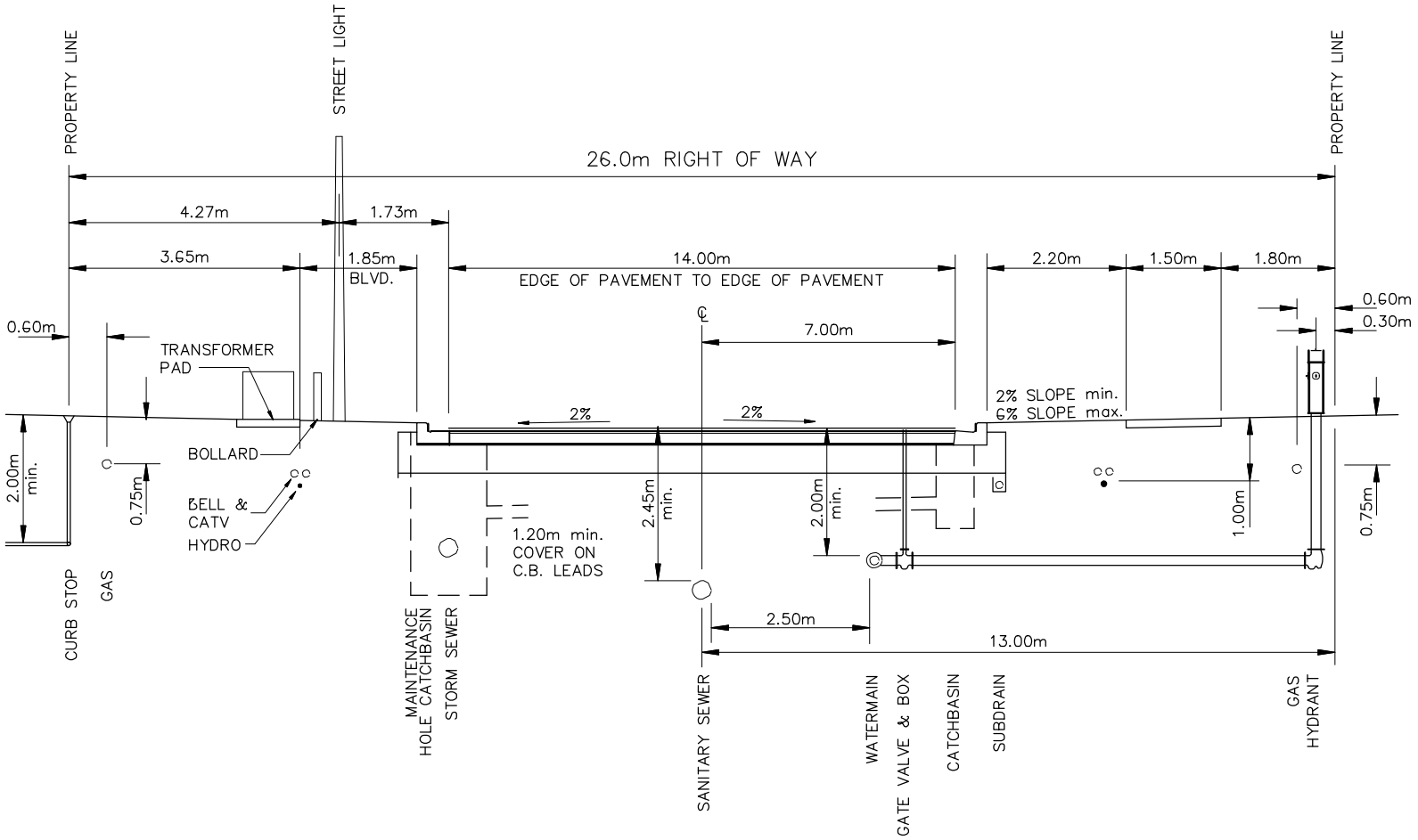
TOWNSHIP OF WELLINGTON NORTH	DATE NOVEMBER, 2000	REV. 0
BARE-ROOT TREE PLANTING DETAIL	STD. **L2**	



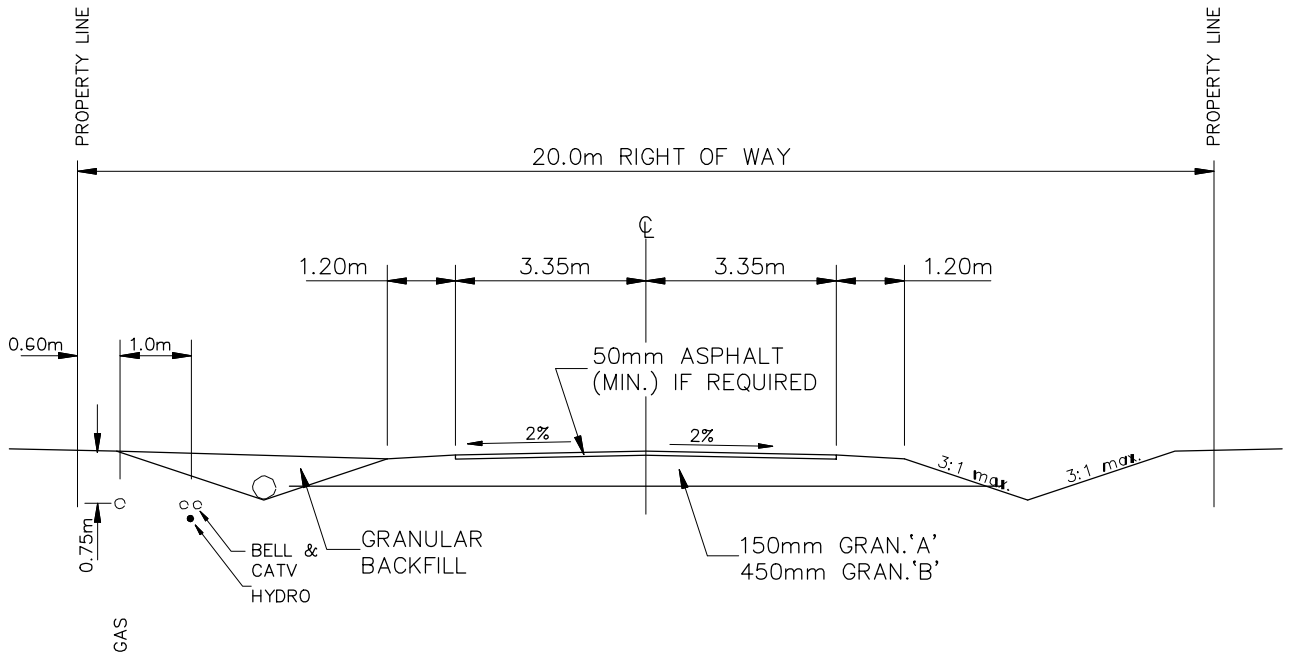
TOWNSHIP OF WELLINGTON NORTH	DATE OCTOBER, 2016	REV. 2
STANDARD CROSS–SECTION LOCAL STREET – 20.0m R.O.W.	STD. **R1**	



TOWNSHIP OF WELLINGTON NORTH	DATE OCTOBER, 2016	REV. 0
STANDARD CROSS–SECTION COLLECTOR STREET 22.0m R.O.W.	STD. **R2**	



TOWNSHIP OF WELLINGTON NORTH	DATE OCTOBER, 2016	REV. 0
STANDARD CROSS-SECTION ARTERIAL/COLLECTOR STREET 26.0m R.O.W.	STD. **R3**	

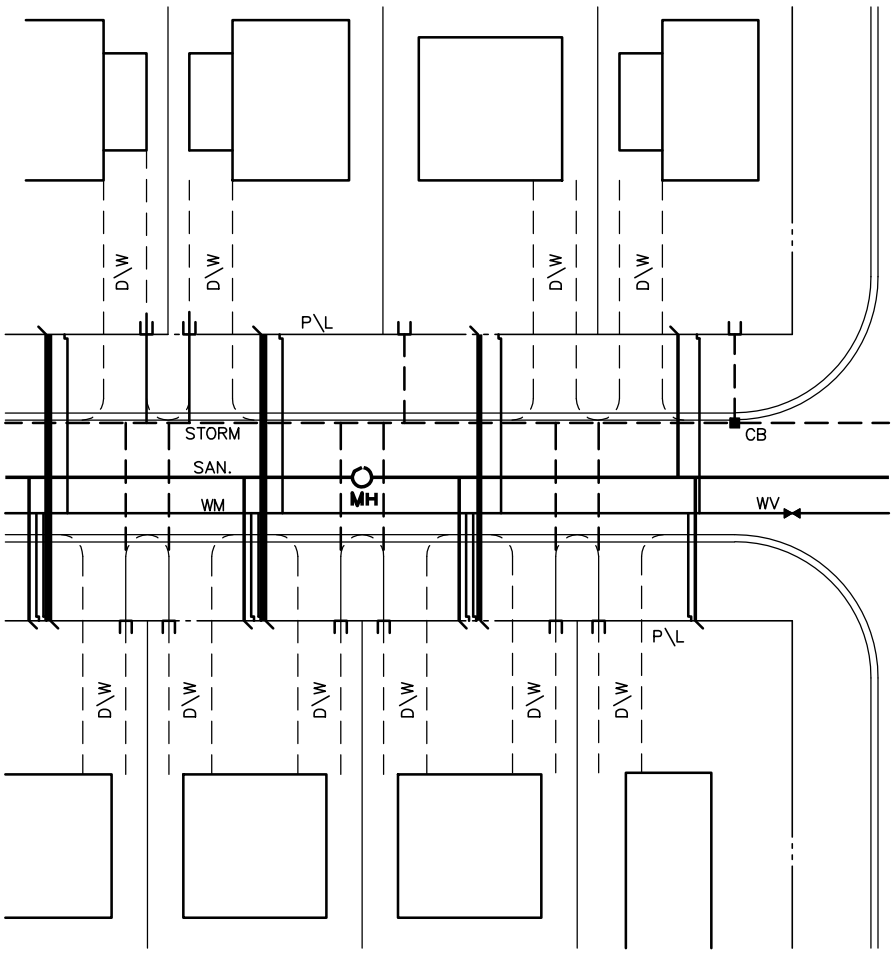


NOTES:

1. BOULEVARD SLOPES – 2% min., 8% max.
2. BOULEVARD & DITCHES TO BE TOPSOILED & SEEDED.
3. MINIMUM DRIVEWAY CULVERT – 400mmØ, 7.3m LONG
4. GRANULAR BASE TO BE CONFIRMED BY SOILS REPORT
5. DITCHES TO BE 150mm min. BELOW GRANULAR ROAD BASE.
6. MINIMUM ROAD GRADE – 0.50%
7. MAXIMUM ROAD GRADE – 8.0%

TOWNSHIP OF WELLINGTON NORTH	DATE OCTOBER, 2016	REV. 1
STANDARD CROSS–SECTION RURAL ROAD – 20.0m R.O.W.	STD. **R4**	

SINGLE FAMILY

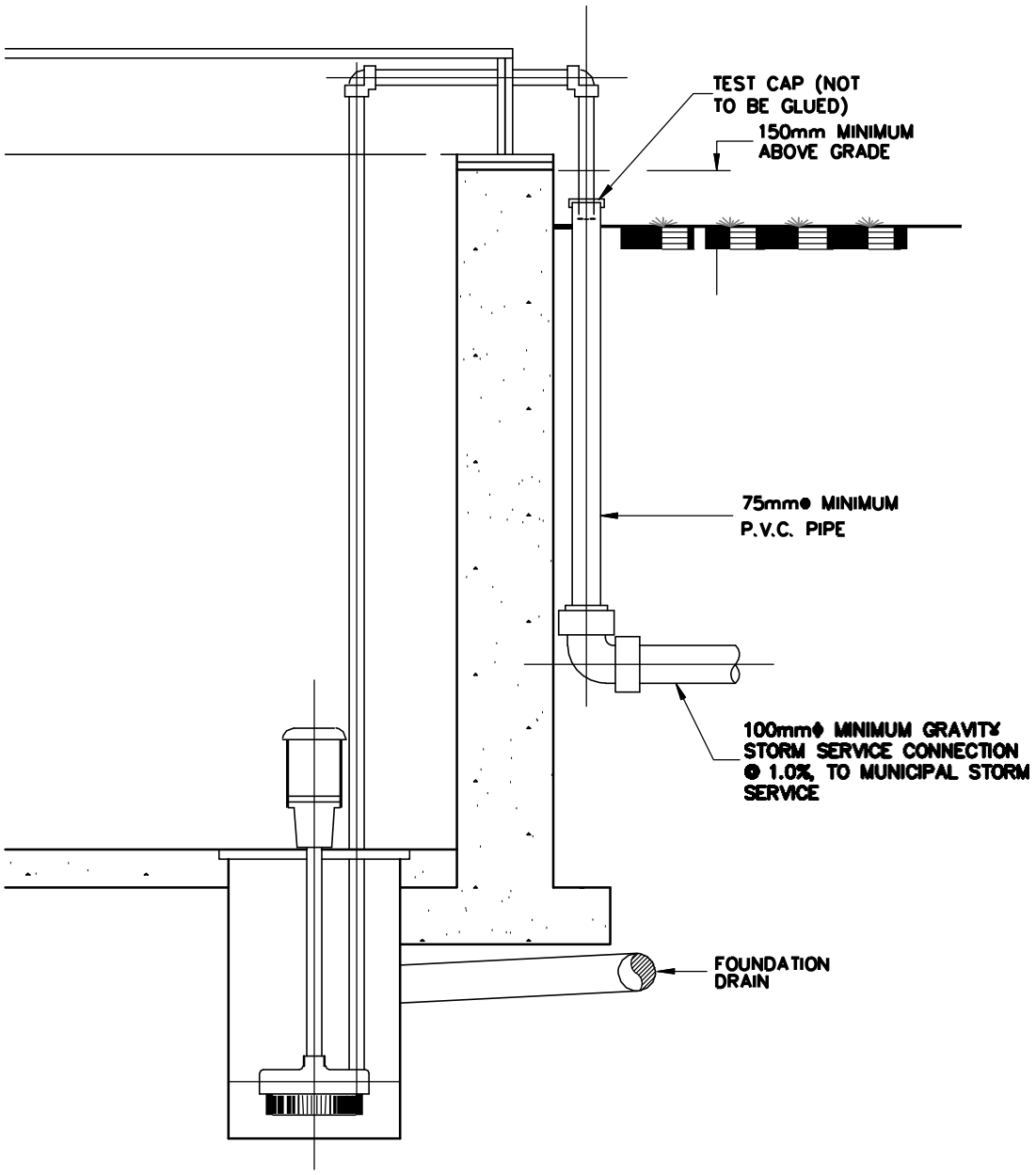


SEMI-DETACHED

NOTES:

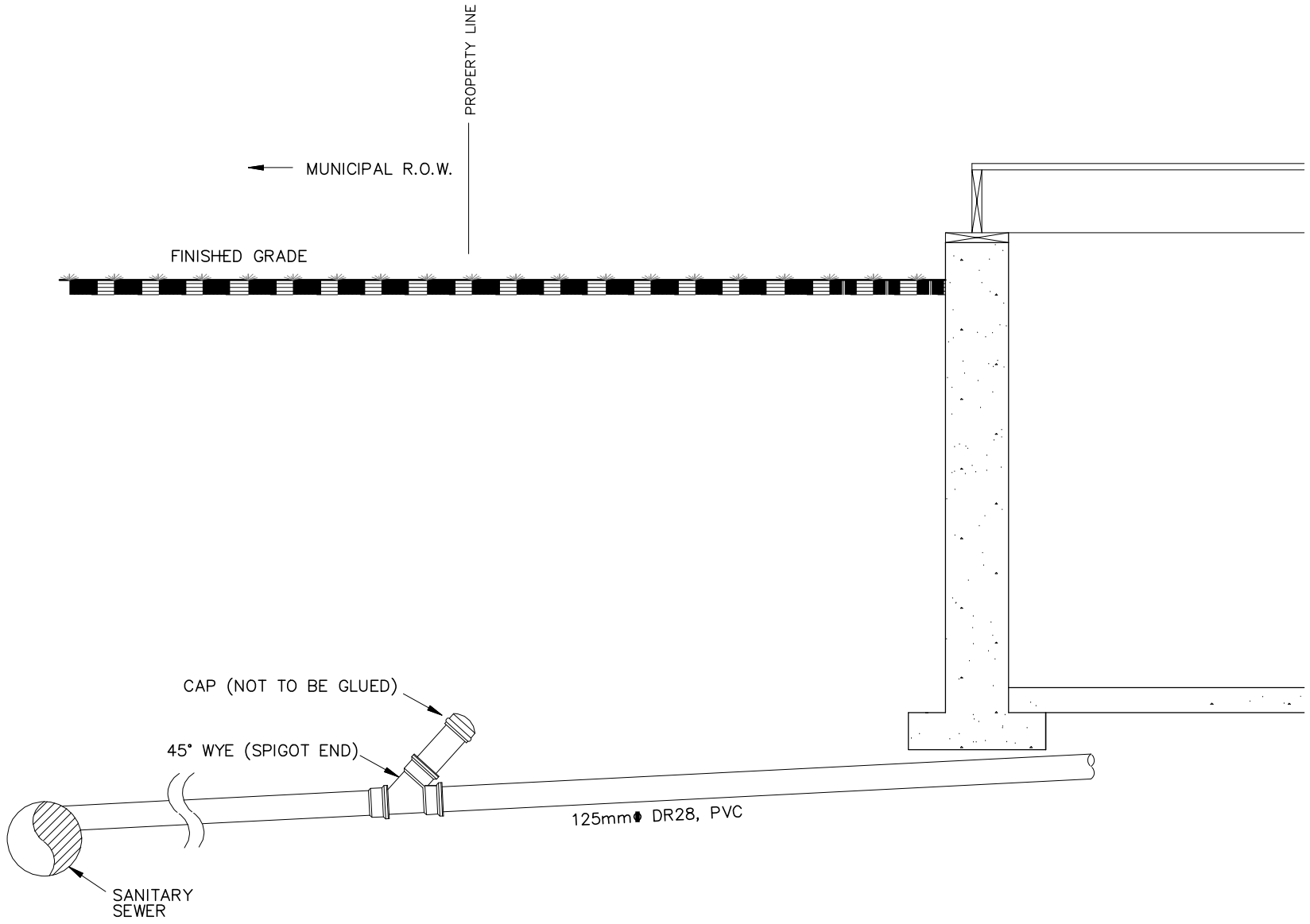
1. 1.5m min. BETWEEN SEWER & WATER SERVICE CONNECTIONS AT CENTRE OF LOT.
2. STORM SEWER SERVICES 1.5m min. FROM SIDE LOT LINE.
3. WATERMAIN VALVES, HYDRANTS & CATCHBASINS NOT TO BE LOCATED IN WALKWAYS OR DRIVEWAYS.
4. ALL SERVICES TO RUN IN A STRAIGHT LINE, PERPENDICULAR TO ℄ OF ROAD FROM MAIN TO PROPERTY LINE.

TOWNSHIP OF WELLINGTON NORTH	DATE NOVEMBER, 2000	REV. 0
TYPICAL SERVICING LAYOUT	STD. **S1**	

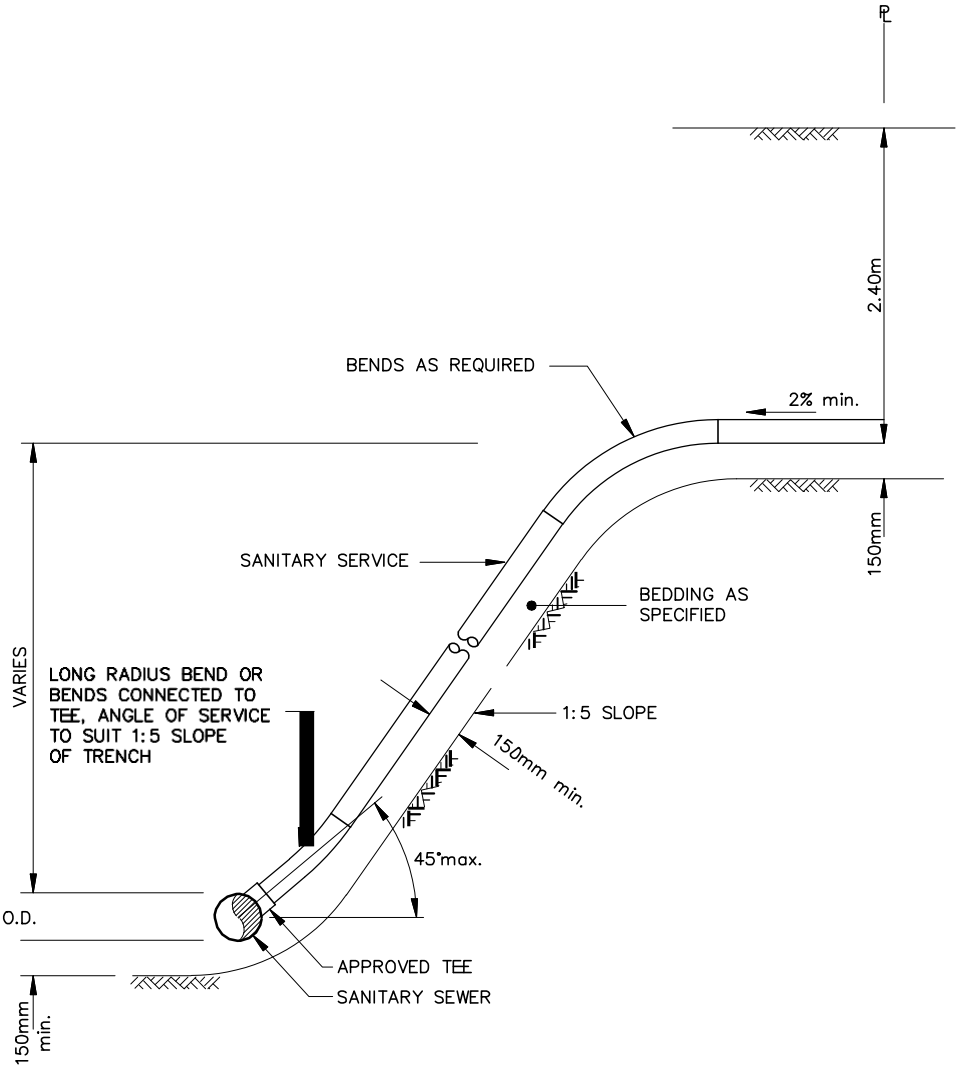


NOTE:
MUNICIPAL STORM SERVICE CONNECTION TO BE LOCATED FIRST.

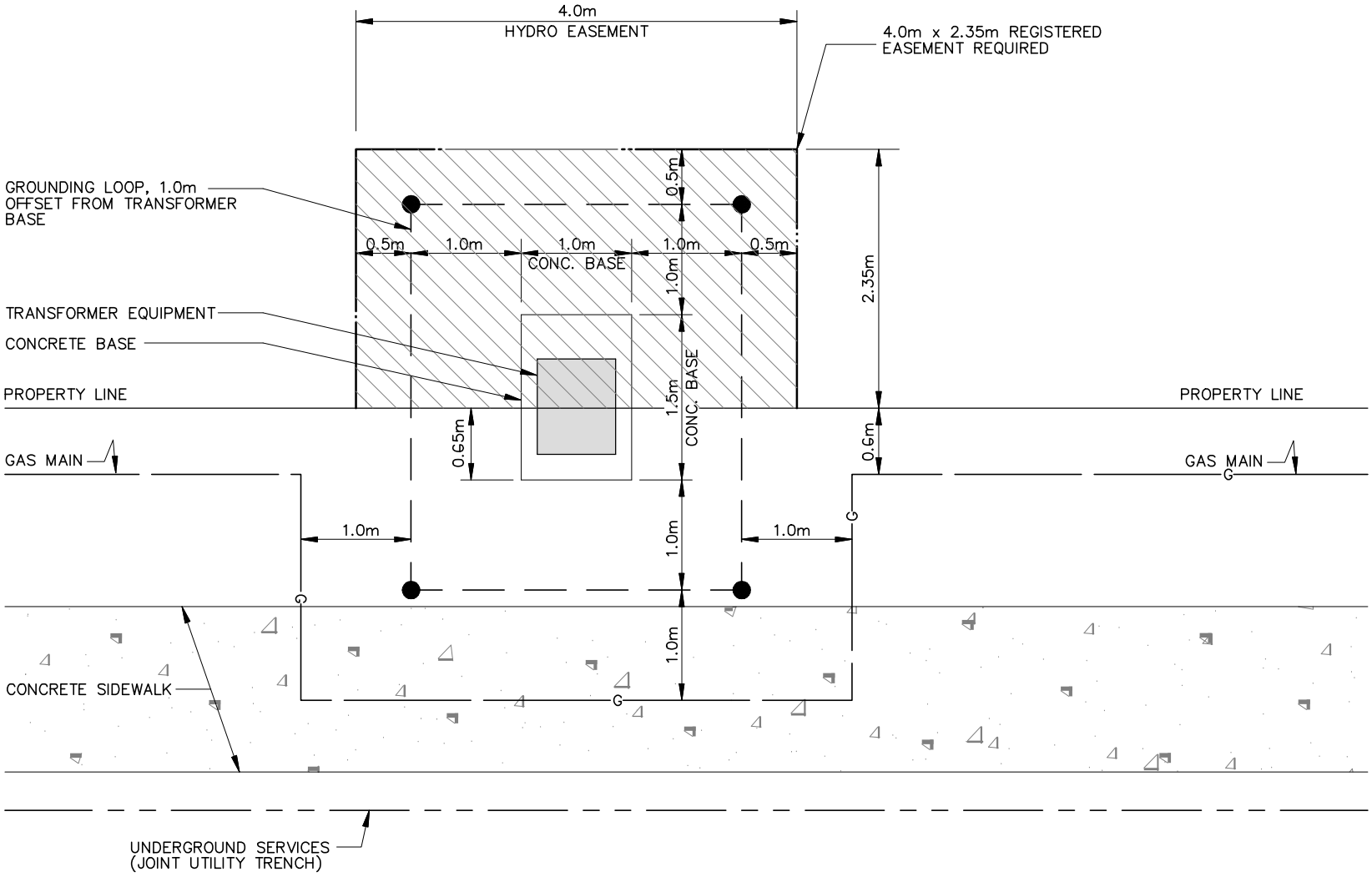
TOWNSHIP OF WELLINGTON NORTH	DATE JANUARY, 2001	REV. 0
SUMP PUMP TO STORM SERVICE CONNECTION	STD. **S2**	



TOWNSHIP OF WELLINGTON NORTH	DATE OCTOBER, 2016	REV. 0
SANITARY SERVICE CONNECTION WITH CLEAN-OUT	STD. **S3**	



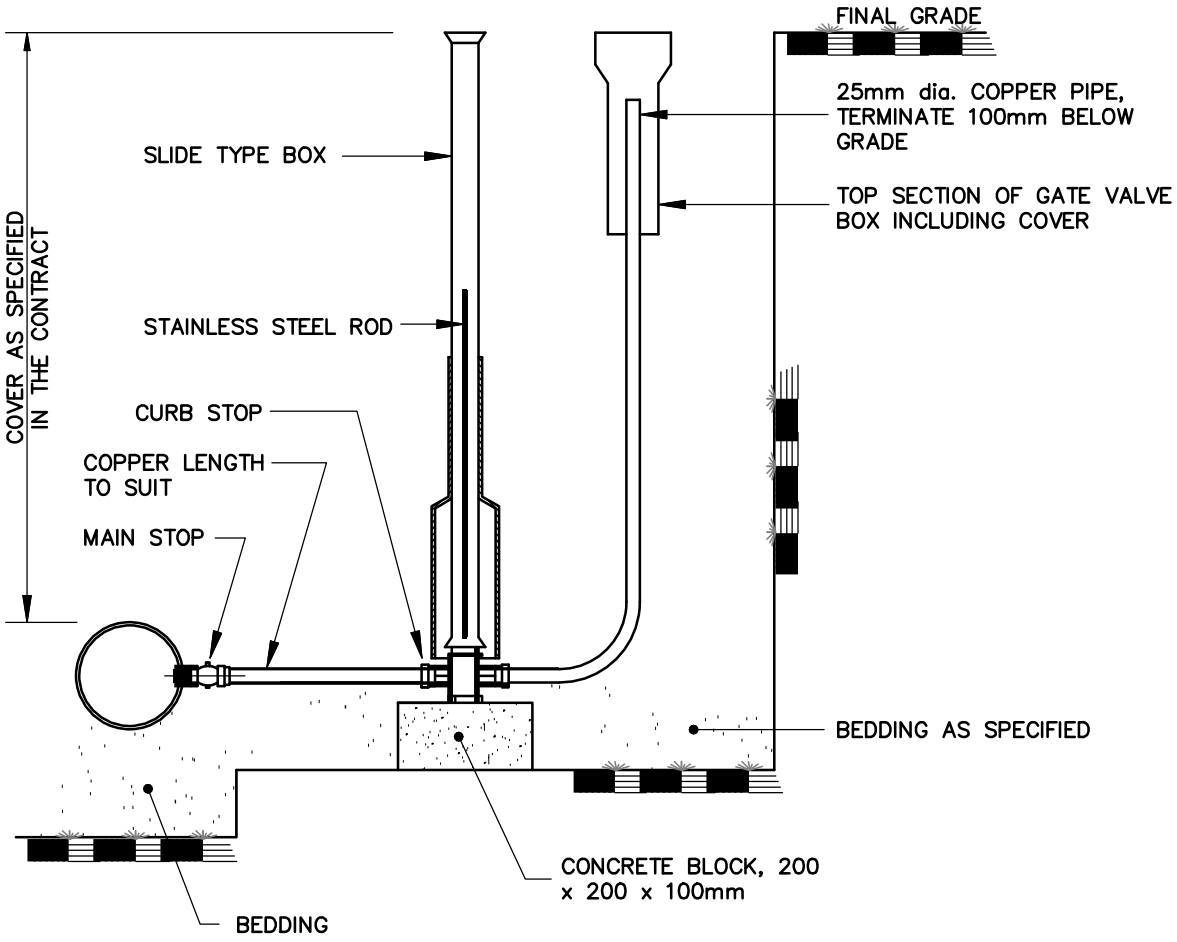
TOWNSHIP OF WELLINGTON NORTH	DATE OCTOBER, 2016	REV. 0
SANITARY SERVICE CONNECTION FOR SEWER MAINS ≥ 4.0m DEEP	STD. **S4**	



NOTES:

1. TRANSFORMER INCLUDING GROUNDING LOOP TO BE ALIGNED ON THE LOT FRONTAGE BASED ON THE FOLLOWING CRITERIA:
   - PLACE ENTIRELY, INCLUDING GROUNDING LOOP. ON ONE LOT IF POSSIBLE TO AVOID CONFLICT WITH SIDE YARD DRAINAGE SWALE AND TO REDUCE EASEMENT REQUIREMENTS.
   - MINIMUM 1.0m CLEARANCE BETWEEN GROUNDING LOOP & MUNICIPAL SERVICES.
   - MINIMUM 1.0m CLEARANCE BETWEEN TRANSFORMER BASE & DRIVEWAYS.
2. EASEMENT SHOWN IS BASED ON 1.5m x 1.0m TRANSFORMER BASE ORIENTED AS SHOWN. BASES LARGER THAN THIS WILL REQUIRE EASEMENT TO BE ADJUSTED ACCORDINGLY.
3. STANDARD SHOWN INCLUDES SIDEWALK, STANDARD WITHOUT SIDEWALK IS THE SAME.

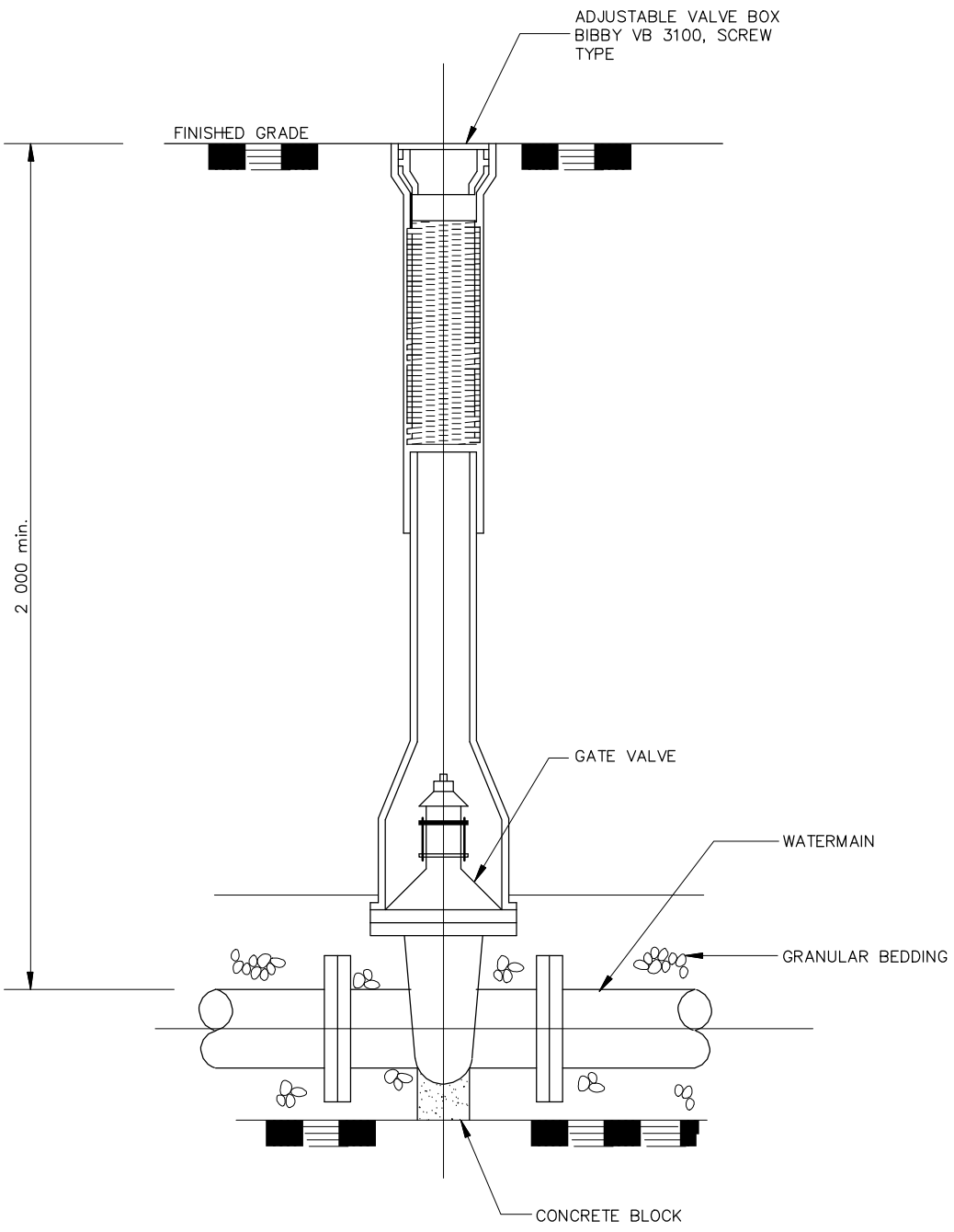
TOWNSHIP OF WELLINGTON NORTH	DATE OCTOBER, 2016	REV. 0
ALTERNATIVE TRANSFORMER LOCATION & GAS ROUTING DETAIL 20.0m & 22.0m ROW	STD. **U1**	



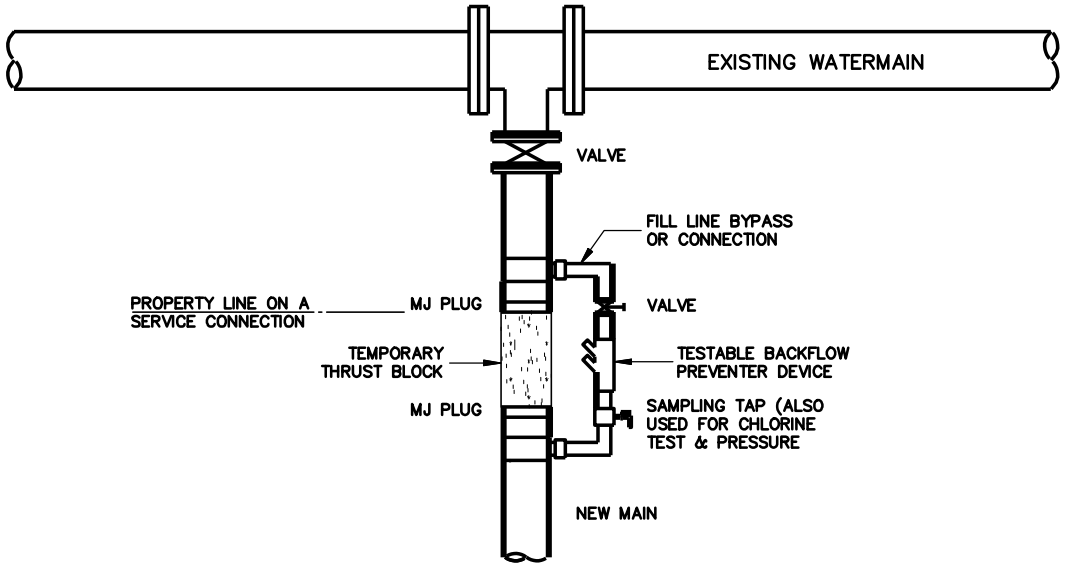
NOTES:

1. SADDLES SHALL BE USED FOR PLASTIC PIPE.
2. ALL DIMENSIONS ARE IN MILLIMETRES OR METRES UNLESS OTHERWISE SHOWN.

TOWNSHIP OF WELLINGTON NORTH	DATE NOVEMBER, 2000	REV. 0
25mm BLOW OFF INSTALLATION	STD. **W1**	

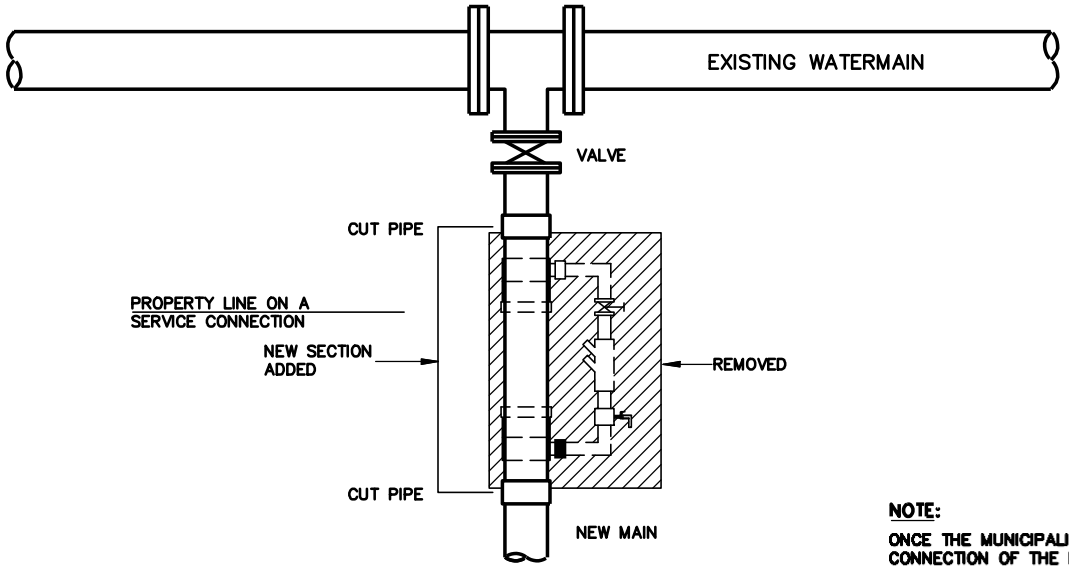


TOWNSHIP OF WELLINGTON NORTH	DATE JANUARY, 2017	REV. 2
VALVE AND VALVE BOX	STD. **W2**	



TYPICAL TEMPORARY CONNECTION ON WATERMAINS OR SERVICES 100mm OR LARGER

TOWNSHIP OF WELLINGTON NORTH	DATE AUGUST, 2010	REV. 0
CONNECTION OF NEW WATERMAIN TO EXISTING WATERMAIN	STD. **W3**	



NOTE:

ONCE THE MUNICIPALITY AUTHORIZES FOR THE CONNECTION OF THE NEW MAIN TO THE EXISTING WATERWORKS SYSTEM, THE PERFORATED SECTIONS OF THE MAIN FOR THE JUMPER LINE MAY BE CUT OFF AT THE INDICATED LOCATIONS, THE JUMPER LINE REMOVED AND A NEW SECTION OF MAIN ADDED.

TYPICAL TEMPORARY CONNECTION ON WATERMAINS OR SERVICES 100mm OR LARGER

TOWNSHIP OF WELLINGTON NORTH	DATE AUGUST, 2010	REV. 0
CONNECTION OF NEW WATERMAIN TO EXISTING WATERMAIN	STD. **W3**	

WELLINGTON NORTH
SEMPER PORRO

MEMO

TO: MAYOR AND MEMBERS OF COUNCIL

FROM: DIRECTOR OF OPERATIONS

DATE: 2021-06-14

SUBJECT: REVISIONS TO MUNICIPAL SERVICING STANDARDS (MSS)

1. Township requests electronic copies of all plans to be submitted for review (PDF & AutoCAD or similar), until approved by Township, at which time, Township requests three hard copies of drawings of 24 x 36 paper and electronic files (PDFs & AutoCAD or similar) for our records. Once "as recorded" drawings are created, Township requests three hard copies of the drawings of 24 x 36 paper copies and electronic files (PDF & AutoCAD or similar & GIS shape files) for permanent records (MSS 2017 A.5).

2. As part of any project with the Township for each property, individual service record sheets (8.5" x 11") are to be provided, to the satisfaction of the Township, by the developer for each applicable municipal service: drinking water, sanitary sewer and storm sewer. Township can provide a template service record sheet on request (MSS 2017 A.10).

3. All private drainage pipes or tiles shall terminate a minimum of 2m from Township property line and not cause any negative impact to public assets (icing on sidewalks, organic growth in gutters, etc.) (MSS 2017 D.1).

4. All water services are to be bedded in approved sand to 300 mm above the top of pipe on public property (MSS 2017 E.2(j)).

5. Additional bullet "Tracer wire is to be left accessible inside the main water valve boxes by extending the wire up the outside of the main valve box through the manufactured hole at the top of the main water valve box for future locating purposes." (MSS 2017 E.2(k)) – see STD. W4.

6. Minimum water service size to be 19 mm but, subject to change, with an intent of the MSS at being consistent with the current version of Ontario's Building Code (MSS 2017 E.2 (r)).

7. Additional wording "and that anodes be included at all water service main stops and property curb stops to the approval of the Township" (MSS 2017 E.2(s)) – see STD. W5.

8. Crosslinked polyethylene (PEX) conforming to AWWA C904, "Municipex" by Rehau, "Blue904" by Ipex or approved equivalent, is an acceptable material for drinking water services (MSS 2017 E.2(r)) – see STD. W4.

9. Watermain testing procedure is consistent with the current version of Ontario's Watermain Disinfection Procedure, or more stringent, at the Township's sole discretion and approval (MSS 2017 E.3).

10. All applicable municipal infrastructure are expected to be designed and constructed consistent with current Provincial and County standards including provisions for accessibility. In the absence of these provisions being met, the developer is expected to obtain approval, or consult, with the local accessibility committee for any proposed deviation(s) (MSS 2017 F.3).

11. Asphalt boulevards are an acceptable alternative, as approved by the Township, up to a boulevard width of 1.8m (MSS 2017 F.5).

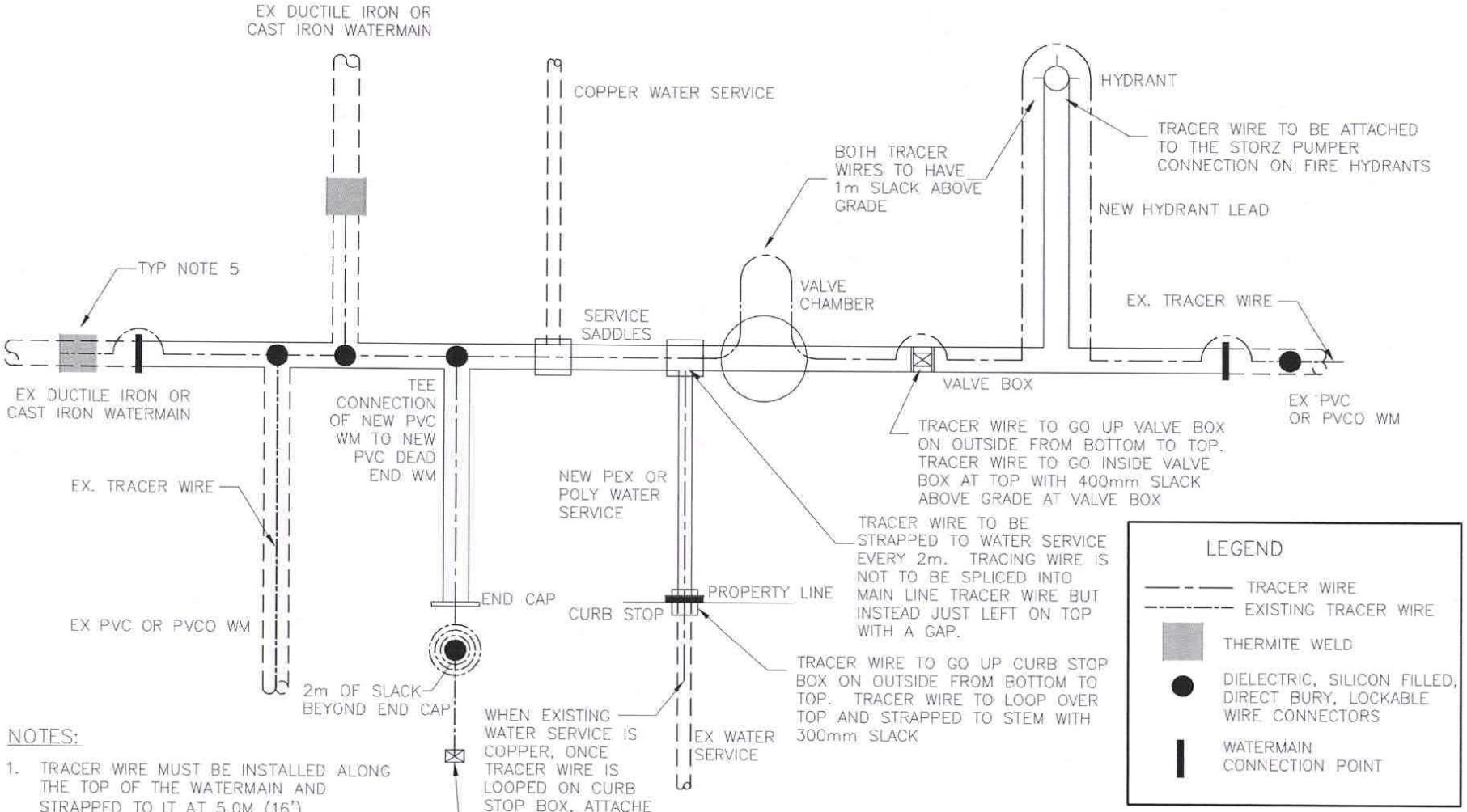
12. Street lights are to be Lumex p/n RFM-72W32LED4K-G2-R2M-UNV-DMG-FAWS-RCD7-GY3 or approved equivalent. Electrical supply for the street light circuit will need to be coordinated and approved by the local hydro authority (MSS 2017 H.2(b)).

13. R1, R2, R3 Standard Cross-Section Update – Bollards are not typically required rather they are assessed on a case-by-case basis and at the discretion of Wellington North Power Inc. and the Township.

14. Update to Table 2 – Section on Storm – Sub-Section Sewer Pipe – Replace "375 mm diameter or less" with "600 mm diameter or less" and "450 mm diameter or greater" with "675mm diameter or greater", subject to approval by the Township.

15. STD. W4 and STD. W5 added.

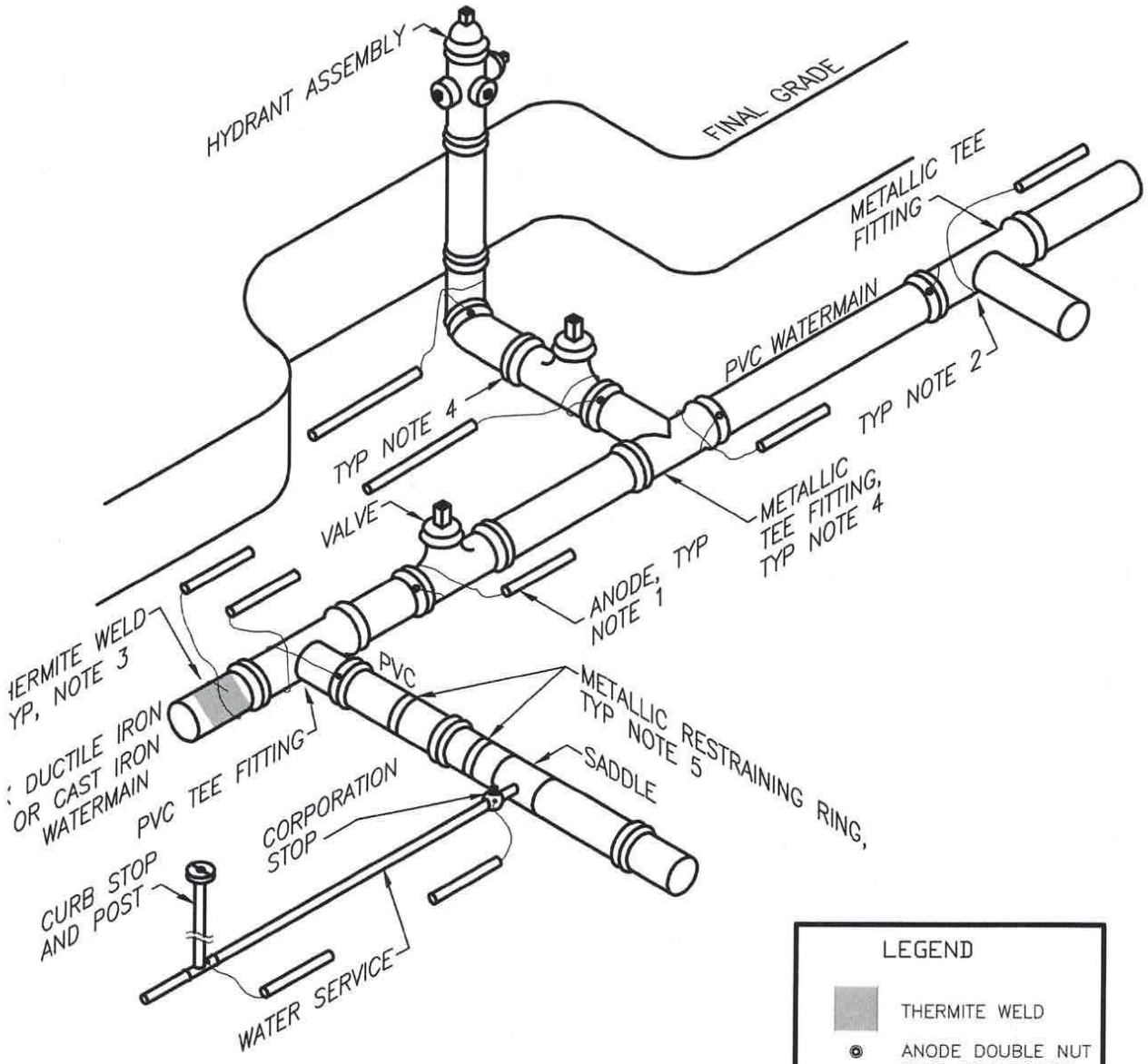
16. The intent of this memo is to provide a minor update to the Municipal Servicing Standards dated June 2017 Rev. 6. All wording and drawings within the MSS have not been reviewed or edited during this update. Township, at its sole discretion, remains the approval authority for any and all infrastructure designs and installations that are or will become owned by the Township.



NOTES:

1. TRACER WIRE MUST BE INSTALLED ALONG THE TOP OF THE WATERMAIN AND STRAPPED TO IT AT 5.0M (16') INTERVALS.
2. EXCEPT FOR APPROVED SPLICED CONNECTIONS, THE TRACER WIRE SHALL BE CONTINUOUS.
3. CONDUCTIVITY TEST IS REQUIRED ON ALL NEW TRACER WIRES THAT ARE INSTALLED.
4. ALL TRACER WIRE BARE ENDS TO BE COVERED TO SEAL OUT MOISTURE AND CORROSION.
5. PROTECTIVE COATING SHALL BE APPLIED TO ALL THERMITE WELDS AS PER OPSD 1109.025.

TOWNSHIP OF WELLINGTON NORTH	DATE JANUARY, 2021	REV. 1
WATERMAIN TRACER WIRE INSTALLATION PROCEDURE	STD. W4	



NOTES:

1. ANODE SHALL BE PLACED AT LEAST 1.0M AWAY FROM THE WATER SYSTEM PIPE AND APPURTENANCES AND AS DEEP AS THE BOTTOM OF THE PIPE AND APPURTENANCES. MINIMUM DISTANCE BETWEEN ANODES SHALL BE 1.0M.
2. ANODE CONNECTING WIRE SHALL BE LOOSELY WRAPPED AROUND PIPES AND FITTINGS AND KNOTTED. ANODE SHALL BE INSTALLED WITH DOUBLE NUT TYPE CONNECTION.
3. PROTECTIVE COATING SHALL BE APPLIED TO ALL THERMITE WELDS AS PER OPSD 1109.025.
4. VALVES AND FITTINGS SHALL HAVE AN ANODE AND SACRIFICIAL ZINC NUTS
5. MECHANICAL RESTRAINTS SHALL HAVE SACRIFICIAL ZINC NUTS

TOWNSHIP OF WELLINGTON NORTH	DATE APRIL, 2019	REV. 0
CATHODIC PROTECTION FOR PVC WATERMAIN SYSTEMS	STD. **W5**	