

General Notes

Drawings

- The notes on this sheet apply to all works under this contract unless otherwise noted on the plan and profile drawings and/or specific detail drawings.
- The standard drawings of the City of Orillia, Ontario Provincial Standards and Specifications (OPSS) and the Ontario Provincial Standard Drawings (OPSD) constitute part of the plans of this contract.
- Order of precedence of standard drawings is firstly City of Orillia and secondly Ontario Provincial Standard Drawings.
- The standard drawings included with these plans are provided for convenience only and are not to be construed to be a complete set for the purpose of the contract. It is the contractor's responsibility to obtain all relevant standard drawings and specifications as required for this contract.
- All dimensions are metres (m), except pipe diameters, which are millimetres (mm), unless specified otherwise.
- All dimensions shall be checked and verified in the field by the contractor prior to any construction and any discrepancies shall be reported immediately to the City's Project Manager.

General

- Existing services and utilities shown on the contract drawings are based on the best information available and their locations are not guaranteed; the City disclaims all responsibility for its accuracy and/or sufficiency. The contractor is required to notify the various utility companies 48 hours prior to the commencement of any work.
- Utility crossings, where required, shall be supported as per the applicable utility company concerned.
- The contractor is responsible (if required) for supporting any existing utilities and/or structures in accordance with the specifications of the utility company concerned.
- A road occupancy permit is required to be submitted to the Environment & Infrastructure Services Department prior to the commencement of work within the City road right-of-way; road occupancy permit may require 3-5 business days to process.
- Prior to commencing any work, tree protection barriers shall be installed at the drip line of the designated trees as shown on the drawings. Reference should also be made to the tree preservation requirements as shown on the landscape architect's plan, where applicable. The tree protection shall be maintained at all times to prevent access to the area beneath the trees. Storage of equipment and supplies shall not be permitted within this area.
- All erosion and sediment control protection devices are to be in place prior to the commencement of construction and shall remain in place and be maintained by the contractor until construction is complete and the grass has established growth, subject to approval by the City's General Manager of Development Services and Engineering or his designate.
- Native material, suitable for backfill, shall be compacted to 95% standard proctor maximum dry density.
- Granular material, used for backfill, shall be placed in layers 150 mm in depth maximum and compacted to 100% standard proctor maximum dry density (SPMDD).
- Embedment for flexible pipe shall be homogeneous Granular A material in accordance with OPSD requirements. Bedding, embedment and cover materials shall be placed for the full width of the trench and compacted to a minimum of 95 percent of Standard Proctor Maximum Dry Density (SPMDD), as specified by ASTM D698 or higher, if recommended by the geotechnical consultant.
- All disturbed areas are to be reinstated to their original condition or better, as determined by the City's General Manager of Development Services and Engineering or his designate. All grass and vegetation covered areas shall be restored by placing 150 mm of screened topsoil and No.1 nursery sod unless noted otherwise.
- All grading must conform to the City of Orillia lot grading policies currently in effect.
- All engine driven pumps used for dewatering or otherwise shall be adequately silenced for operation in residential areas.

Roads

- The minimum pavement design for all local roadways shall be:
 - Subgrade soils compacted to a minimum of 95 percent Standard Proctor Maximum Dry Density.
 - 400 mm compacted depth of OPSS.MUNI 1010 Granular B.
 - 150 mm compacted depth of OPSS.MUNI 1010 Granular A.

- 60 mm compacted depth of SP 19.0 hot mix asphalt binder course.
- 40 mm compacted depth of SP 12.5 hot mix asphalt surface course.
- The minimum pavement design for all Collector and Arterial roadways shall be:
 - Subgrade soils compacted to a minimum of 95 percent Standard Proctor Maximum Dry Density.
 - 400 mm compacted depth of OPSS.MUNI 1010 Granular B.
 - 150 mm compacted depth of OPSS.MUNI 1010 Granular A.
 - 100 mm compacted depth of SP 19.0 hot mix asphalt binder course.
- 50 mm compacted depth of SP 12.5 hot mix asphalt surface course.
- OPSS.MUNI 1010 Granular 'A' and Granular 'B' materials shall be used for road construction. Native subgrade shall have a crossfall of 2 %.
- Native subgrade to be compacted to minimum 95% SPMDD and shall be proof rolled and approved by the soils consultant prior to installation of granular road base. All granular road base material shall be compacted to 100% SPMDD.
- Subdrains shall be constructed in accordance with the OPSS.MUNI 405. Subdrains shall be connected to a drainage structure. Subdrains shall be a minimum 150 mm in diameter with a minimum 0.5% slope and shall be installed continuously below the curb and gutter unless stated differently in the geotechnical report otherwise.
- New urbanized City streets shall be constructed with barrier curb and gutter to OPSD 600.070 on all roadways unless approved otherwise by the City. Curb termination shall be made as per OPSD 608.010.
- All curbs shall be depressed at all walkway, driveway and sidewalk locations.
- All curb radii to follow the City's design criteria as outlined within Table 2 of section 2.3 of the City's Transportation Engineering Design Criteria.
- Concrete strength for curb and gutter to be 32 MPa at 28 days.
- Sidewalks shall be constructed according to OPSD 310.010, 310.020, 310.030, 350.010, 351.010 and OPSS MUNI 351 and are to be 1.5m wide.
- Concrete sidewalks shall be placed on a minimum 150 mm compacted granular A base consistent with OPSS.MUNI 1010.
- Concrete strength for sidewalk to be 32 MPa at 28 days.
- Sidewalk ramps to comply with OPSD 310.030.
- The design of driveways to follow the City's design criteria as outlined within the City's Transportation Engineering Design Criteria.
- Temporary dead-end barricade to be as per OPSD 912.532.

Sanitary Sewers

- All sanitary sewers shall be located as shown on the typical City roadway cross sections. In general, this location is 1.5 m south or west of the centreline of the roadway.
- Maximum pipe deflection from combined live and dead loading shall not exceed any CSA, OPS or manufacturers recommended specifications.
- The material type of gravity sanitary sewers shall follow the City's design criteria as outlined within the City's Wastewater Engineering Design Criteria.
- Sanitary sewers shall be constructed in accordance with the City of Orillia's Wastewater Engineering Design Criteria, OPSS.MUNI 401, and OPSS.MUNI 410.
- Flexible pipe sewers shall not be installed with a depth of cover greater than 6.0m unless specifically approved by the City.
- Pipe embedment and backfill for flexible pipes shall be in accordance with OPSD 802.101 and 802.014. Pipe Embedment shall be Granular 'A' in accordance with OPSS.MUNI 1010, unless otherwise approved by the City.
- Pipe bedding and backfill for rigid pipes shall be in accordance with OPSD 802.030 to 802.032, inclusive. Pipe Bedding shall be Granular 'A' in accordance with OPSS.MUNI 1010, unless otherwise approved by the City. Pipe cover mater shall be Granular 'A', or Granular 'B' (100 % passing the 26.5 mm sieve), unless otherwise approved by the City.
- Safety platforms shall be installed in accordance with OPSD 404.020 in all maintenance holes greater than 5.0 m in depth.

- accordance with OPSD 401.010 Type A and labeled "SANITARY".
- Maintenance hole tops (frames) are to be set to the base course asphalt grade, and then adjusted to the final grade when the surface lift of asphalt is placed. Final grade and crossfall adjustments shall be made using adjustable maintenance hole frames.
- Full height benching is required in maintenance holes for pipes 300 mm or less in diameter. Three-quarter height benching can be used for pipes greater than 300 mm. Maintenance holes shall be pre-benched. All benching and pipe opening alternatives must comply with OPSD standards, including OPSD 701.021.
- Drop structures shall be used when invert elevations of the inlet and outlet sewers differ by greater than 0.61 m. Drop structures shall be external as per OPSD 1003.010 or 1003.020 unless the maintenance hole is of a large size (i.e. 1500 mm or larger in diameter).

Sanitary Service Laterals

- Sanitary service connections for single family residential properties shall be minimum 125 mm in diameter.
- Sanitary connections for multiple family residential block, institutional, commercial and industrial block developments shall be minimum 200 mm in diameter, and an inspection maintenance hole shall be required on private property 1.50 m from property line to centre of rim.
- Lateral connections shall be PVC pipe DR28 and green in colour. Laterals larger than 150 mm shall be PVC DR 35. In accordance with MECP Design Criteria, all service connections are to be watertight.
- The depth of the service connections for single-family units and semi-detached units at the property line, measured from the final centreline road elevation shall be minimum 2.50 m.
- Risers shall be used for sanitary service connections when the depth to obvert of the sewer main exceeds 4.50 m. The riser connection shall not exceed 3.0 m in depth. The use of risers shall be in accordance with MECP Design Criteria.
- Sanitary sewer service connection grades shall follow Table 5 within the City's Wastewater Engineering Design Criteria.
- All sanitary sewer service connections for single and semi-detached dwellings and townhouse units shall be individual services.
- Sanitary connections shall be in accordance with OPSD 1006.010 Sewer Service Connections for Main Pipe Sewer.
- Sewer service connections shall be installed to the mid-point of the frontage of all single-family lots as shown on the City's Standard Drawings. The service pipe must be installed at right angles to the main and in a straight line from the main to the lot.
- For new development, residential connections shall terminate at the center of the property line with a Crowle test fitting, 125 mm x 100 mm reducer, plug suitably braced to withstand test pressures and 89 mm x 38 mm marker placed from the invert of the connection to 600 mm above grade painted green.
- All connections to new sanitary mains shall be made with pre-manufactured, approved tees and saddles.

Storm Sewers

- Both rigid and flexible pipes are allowed in the construction of storm sewer systems. Storm sewer sizes 450 mm diameter or greater shall be constructed of reinforced concrete.
- Plugged or capped service laterals shall be marked by a white painted 2 x 4 stake at the end cap from the invert of the connection to 600 mm above surface grade with adhesive tape labelled "CAUTION STORM SEWER". The service lateral shall be capped 0.3 m inside of property line.
- The minimum cover to the top outside pipe barrel of a storm sewer system shall not be less than 1.5 metres from the centreline of the roadway unless alternate measures are implemented as approved by the City.
- All storm sewers shall generally be located as shown on the standard City road cross-section drawings, unless approved by the city. This standard location shall be generally 1.5 metres north or east of the centreline of the road allowance.
- Pipe embedment and backfill for flexible pipes shall be in accordance with OPSD 802.010 and 802.014. Pipe embedment shall be Granular 'A' in accordance with OPSS.MUNI 1010, unless otherwise approved by the City of Orillia.
- Pipe bedding and backfill for rigid pipes shall be in accordance with OPSD 802.030 to 802.032, inclusive, or for elliptical pipes,

- OPSD 802.050 to 802.054, inclusive. Pipe bedding shall be Granular 'A' in accordance with OPSS.MUNI 1010, unless otherwise approved by the City of Orillia. Pipe cover material shall be granular 'A', or Granular 'B' (100 % passing the 26.5 mm sieve), unless otherwise approved by the City of Orillia.
- Bedding, embedment and cover materials shall be placed for the full width of the trench and compacted to a minimum of 95 percent of Standard Proctor Maximum Dry Density (SPMDD).
- Maintenance holes and catch basins shall be precast concrete and shall be constructed in accordance with City of Orillia engineering design criteria, OPSS.MUNI 402, and OPSS.MUNI 407.
- Maintenance hole and catch basin frames shall be set to the base course asphalt grade, and then adjusted to the final grade when the surface lift of asphalt is placed. Final grade and crossfall adjustments shall be made using adjustable maintenance hole frames.
- Maintenance holes and catch basins shall be provided with monolithic bases and watertight joints.
- Safety platforms shall be installed in accordance with OPSD 404.020 for all maintenance holes deeper than 5.0 m.
- All storm maintenance hole covers shall be in accordance with OPSD 401.010 Type B and labeled "STORM".
- Street catch basin frame and grates shall be in accordance with OPSD 400.100, rear yard catch basins frame and grates shall be in accordance with OPSD 403.010
- Single catch basin leads shall be 300 mm diameter, double catch basin and ditch inlet leads shall be 375 mm diameter.

Watermains

- Watermains up to 400 mm diameter shall be constructed using polyvinyl chloride pipe (PVC), ductile iron (DI), or concrete pressure pipe (CPP) manufactured in accordance with current CSA and AWWA standards, unless otherwise approved by the City.
- A tracer wire shall be provided along the top of all watermains to permit future field tracing. These tracer wires shall be attached to the top of the watermain and shall be looped inside each valve box, including hydrant valves and shall also be connected to the bottom flange of all hydrants. Refer to the City's approved material specifications list for tracer wire gauge and approved manufacturers.
- All ferrous fittings, pipes, and tracer wires shall have corrosion protection provided by means of sacrificial anodes. Sacrificial anodes shall be in the form of packaged zinc anode or zinc anode caps and meet ASTM B-418-73-type II. Anode caps are to be installed on every valve, hydrant, and fitting bolts connected to ferrous and a non-ferrous watermain.
- Watermains shall be located as shown on the standard City road cross-section. This location shall generally be on the north or east sides of the street.
- A minimum horizontal separation of 2.5 m shall be provided between the outside of the pipe barrels of the (sanitary/storm) sewers and watermains.
- Watermains shall have no less than 1.9 m of cover from final surface grade.
- The contractor shall inform the City of Orillia no less than 48 hours in advance of commencing work on water infrastructure.
- Pipe embedment and backfill for flexible pipes shall be in accordance with OPSD 802.010 and 802.014. Pipe embedment shall be Granular 'A' in accordance with OPSS.MUNI 1010, unless otherwise approved by the City of Orillia.
- Pipe bedding and backfill for rigid pipes shall be in accordance with OPSD 802.030 to 802.032, inclusive. Pipe bedding shall be Granular 'A' in accordance with OPSS.MUNI 1010, unless otherwise approved by the City of Orillia. Pipe cover material shall be granular 'A', or Granular 'B' (100 % passing the 26.5 mm sieve), unless otherwise approved by the City of Orillia.

- Bedding, embedment and cover materials shall be placed for the full width of the trench and compacted to a minimum of 95 percent of Standard Proctor Maximum Dry Density (SPMDD).
- Forcemains subject to traffic loading, the depth of pipe cover must consider a loading factor in accordance with relevant regulations, codes, and by-laws of the authorities having jurisdiction.
- Native material, suitable for backfill, shall be compacted to 95% standard proctor maximum dry density.
- Adequate restraint must be provided at all fittings and deflections in the water distribution system to prevent pipe movement and subsequent joint failure. Mechanically restrained joints or concrete thrust blocks in accordance with OPSD 1103.010 and 1103.020 shall be used for all watermains. The recommended type of restraint in the design will depend on anticipated soil conditions.
- Hydrants and appurtenances shall conform to all applicable CSA and AWWA requirements. Fire hydrants shall be non-rising stem, open left with 2 CSA hose ports, one pumper port, complete with traffic flange at no more than 100 mm above final grade. The hydrant lead shall be minimum 150 mm with resilient seated gate valve shut off "Open Left". The hydrants shall have all drain holes plugged and be installed as per OPSD 1105.010. In all areas hydrants shall be equipped with 114 mm diameter Pumper ports and two - 64 mm diameter side ports. All hydrants to be equipped with Storz connection.
- All valve boxes and valve chambers shall be located in boulevards (behind the curb radius) and out of pavement areas wherever possible.
- Valves in excess of 1.7m in depth shall require a valve stem extension.
- The operation of fire hydrants and/or valves on live potable water systems by personnel other than City Operators is strictly prohibited.
- Commissioning of new watermains must adhere to the City of Orillia's Watermain Commissioning standard operating procedure.

Water Services

- The minimum size of service connection permitted shall be 25 mm in diameter.
- All services are to be a minimum bury of 1.9 m throughout the installation. The maximum bury at property line is to be 2.5 m. All requirements for separation of water and sewer must be followed for servicing as well. Water service valve boxes shall not be located in driveways. In the event the designed driveway and water service box locations conflict as a result of the final house siting, the water service box shall be moved to a location to the satisfaction of the City.
- Curb stops on all water service connections 50 mm in diameter and less shall be located at the property line; curb stops shall not be located within a driveway.
- Service tapping off an existing charged waterman may only be done by the City of Orillia at the owner's expense.
- Insulate water services at utility crossings where 0.5 m separation cannot be maintained.
- Service tappings shall be placed at a minimum separation of 1.0 m and a minimum of 0.6 m from joints.
- Connections to the main must be oriented appropriately, between 3 o'clock and 9 o'clock, with no installations allowed at 12 o'clock. All services must include a strain relief loop off the main.
- After construction, the end of the connection shall be marked by a suitable length of 50 mm x 100 mm lumber ("stake" for consistency) extending from the end of the connection to a point 0.9 m above grade. The top of this marker shall be painted blue.

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