STORM SYSTEM

MH No.	DESCRIPTION	T/G	INVERTS
ST1	1.2mø P/C MH	196.90±	EX., 194.45 SW 194.50
ST2	STORMCEPTOR MODEL EF06	197.05	NE 194.54 SW 194.60
ST3	1.5mø P/C CB/MH	197.02	NE 194.61 NW 194.65 SW 194.70 SE 194.65
ST4	0.6x0.6x1.67m P/C CB	196.20	SE 194.77
ST5	1.2mø P/C CB/MH	197.80	NE 194.80 SW 195.11 S 195.00
ST6	1.2mø P/C CB/MH	198.00	N 195.31 W 195.40 S 195.35
ST7	1.2mø P/C CB/MH	197.95	E 195.51 SW 195.55
ST8	0.6x0.6x1.83m P/C CB	198.65	NE 196.95 S 196.97
ST9	0.6x0.6x1.67m P/C CB	199.00	N 197.48 S 197.50
ST10	0.6x0.6x1.67m P/C CB	199.90	N 198.38
ST11	1.2mø P/C CB/MH	199.10	N 196.02 SW 196.09 S 196.50
ST12	1.2mø P/C CB/MH	199.10	NE 196.15 N 196.18 W 196.30
ST10	0.6x0.6x1.98m P/C CB	200.10	N 198.30

SANITARY SYSTEM

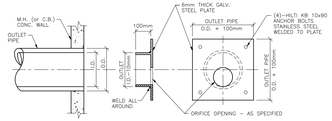
MH No.	DESCRIPTION	T/G	INVERTS
S1	1.2mø P/C MH	196.80±	EX., 194.00 SW 194.05
S2	1.2mø P/C MH	196.90	NE 194.10 S 194.15
S3	1.2mø P/C MH	198.30	N 194.32 E 194.40
S4	1.2mø P/C MH	197.95	W 194.48 S 194.60
S5	1.2mø P/C MH	198.20	N 194.74 W 194.80 S 194.80
S6	1.2mø P/C MH	198.30	E 195.09
S7	1.2mø P/C MH	199.40	N 195.70 W 195.97
S8	1.2mø P/C MH	199.30	E 196.10 S 196.20
S9	1.2mø P/C MH	200.60	N 196.90 W 197.38
S10	1.2mø P/C MH	200.40	E 198.00

WATERMAIN CROSSINGS

LOCATION	STM. INV.	STM. OBV.	SAN. INV.	SAN. OBV.	W/M INV. AT CROSSING ONLY	W/M OBV. AT CROSSING ONLY
1	194.66	195.26			193.90±	194.05±
2	194.78	195.16			195.95	196.10
3	195.61	195.86			196.65	196.80
4			194.95	195.15	196.65	196.80

• DENOTES LOCATION WHERE WATERMAIN IS TO BE LOWERED BELOW STORM SEWER (ONLY) OR SANITARY SEWER (ONLY) USING 45° VERT. BENDS (PROVIDE 0.50m MIN. CLEARANCE – WATERMAIN ELEVATIONS SHOWN ARE THE LOWERED ELEVATIONS AT INDICATED CROSSING LOCATIONS)

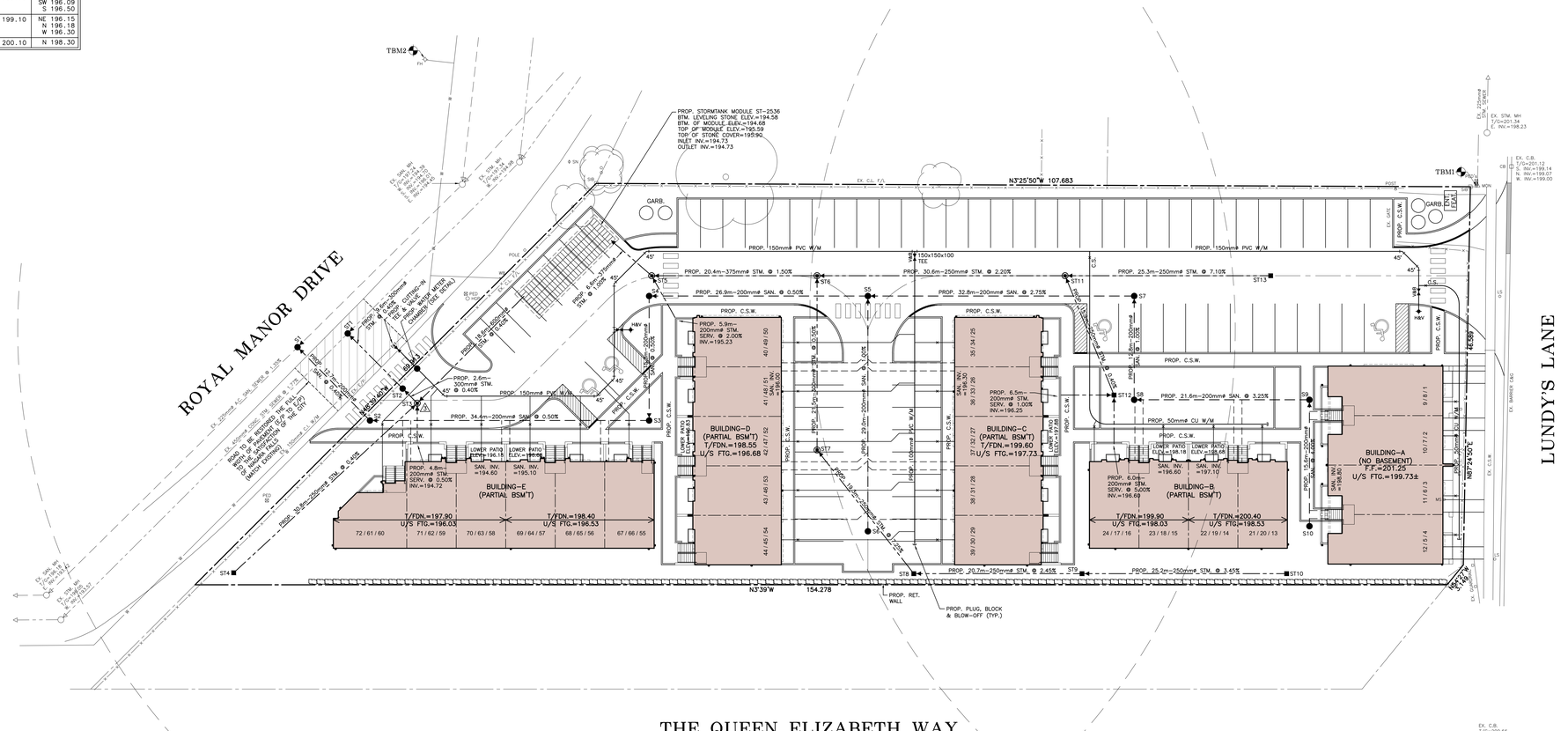
C.B. ORIFICE PLATE SIZING	
ORIFICE PLATE CONFIGURATION NUMBER	DIAMETER OF ORIFICE PLATE OPENING
1	290mm



FLOW CONTROL DEVICE
ORIFICE PLATE
N.T.S.

T.B.M. No. 1 ELEV. = 201.63m (GEO)
TOP OF SURVEY MONUMENT AT THE S.E. CORNER OF SUBJECT PROPERTY AS SHOWN.

T.B.M. No. 2 ELEV. = 198.07m (GEO)
TOP NUT OF FIRE HYDRANT ON THE NORTH SIDE OF ROYAL MANOR DRIVE AS SHOWN.



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ELECTRICAL CONSULTANT

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No.	Date	Version	Dwn.

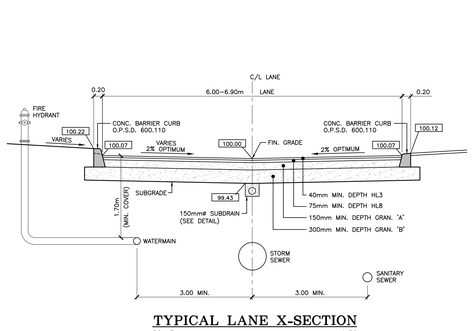
PROJECT:
PROPOSED MIXED USE DEVELOPMENT
7301 Lundy's Lane
City Of Niagara Falls
Canada

DRAWING TITLE:
SERVICING PLAN

LICENSED PROFESSIONAL ENGINEERS
06/10/23
R. W. PHILLIPS
PROVINCE OF ONTARIO

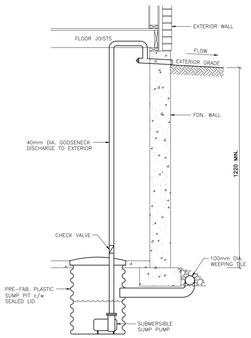
DRAWN BY: K.P.B. DATE: OCT. 5/23
CHECKED BY: R.W.P. SCALE: 1:250

PROJECT NO.: 16364
DRAWING NO.: C-02



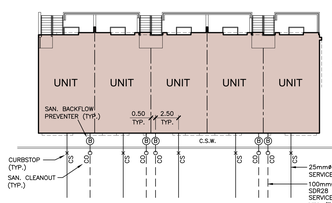
TYPICAL LANE X-SECTION

SCALE: 1:50



SUMP PUMP WITH GOOSE NECK DETAIL

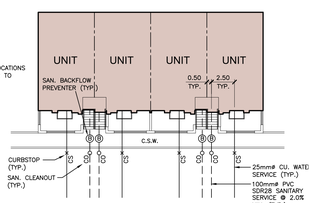
N.T.S.



NOTE:
SOME SERVICE LOCATIONS MAY VARY (REFER TO SERVICING PLAN)

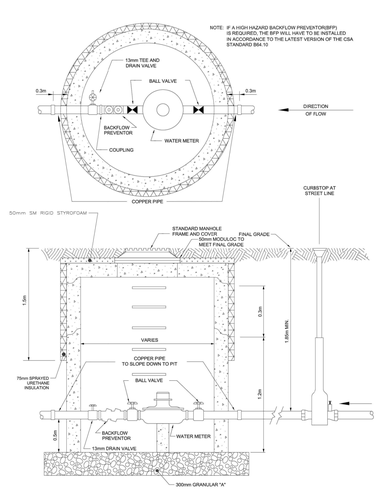
UNITS SERVICING (REAR OF BLDG.)

SCALE: 1:250



UNITS SERVICING (FRONT OF BLDG.)

SCALE: 1:250



WATER METER CHAMBER DETAIL

(N.T.S.)

WATER METER CHAMBER NOTES:

1. NO BYPASS VALVE IS TO BE INCLUDED IN THE WATER METER CHAMBER.
2. THE WATER METER IS TO BE A NEPTUNE PRODUCT PURCHASED DIRECTLY FROM THE CITY OF WELLAND PUBLIC WORKS.
3. THE RADIO TRANSMITTER FOR THE WATER METER IS TO BE INSTALLED EXTERNAL TO THE CHAMBER, WITH THE WIRE PASSED THROUGH A 50mm GALVANIZED STEEL CONDUIT, CORED THROUGH THE CHAMBER WALL. THE CONDUIT SHOULD TERMINATE IN THE BOULEVARD DIRECTLY WEST AND AS CLOSE TO THE CHAMBER AS POSSIBLE, MOUNTED TO A 4x4 POST.

GENERAL NOTES:

1. CONSTRUCTION OF SEWERS AND RELATED APPURTENANCES SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE CURRENT STANDARDS OF THE CITY O NIAGARA FALLS, AND THE ONTARIO PROVINCIAL STANDARDS DRAWINGS (OPSD). THE CITY OF NIAGARA FALLS STANDARDS SHALL TAKE PRECEDENCE OVER THE OPSD DRAWINGS.
2. INFORMATION REGARDING ANY EXISTING SERVICES AND/OR UTILITIES SHOWN ON THE APPROVED SET OF CONSTRUCTION DRAWINGS IS FURNISHED AS THE BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL INTERPRET THIS INFORMATION AS THEY SEE FIT WITH THE UNDERSTANDING THAT THE OWNER AND HIS AGENTS DISCLAIM ALL RESPONSIBILITY FOR ITS ACCURACY AND/OR SUFFICIENCY.
3. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION AND HE SHALL REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ENGINEER.
4. RELOCATION OF EXISTING SERVICES AND/OR UTILITIES SHALL BE CONSTRUCTED AS SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER.
5. THE CONTRACTOR SHALL OBTAIN ALL PERMITS FOR CONSTRUCTION.
6. FOR ALL SEWERS AND WATERMAIN IN FILL SECTIONS, THE COMPACTION SHALL BE VERIFIED PRIOR TO LAYING OF PIPE.
7. NO SUBSTITUTIONS WILL BE ALLOWED WITHOUT WRITTEN APPROVAL FROM THE CITY OF NIAGARA FALLS OR THE ENGINEER.
8. ALL EXCAVATIONS TO BE BACKFILLED WITH SELECT NATIVE MATERIAL, APPROVED BY THE ENGINEER, TO 95% S.P.D.
9. THE DEVELOPER AND/OR CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND MAINTAINING (UNTIL ROAD CONSTRUCTION IS FINISHED) SILT CONTROL DEVICES AS SHOWN ON THE DRAWINGS AND AS DIRECTED BY THE ENGINEER.
10. ALL WORKS SHALL BE DESIGNED AND CONSTRUCTED SO AS TO COMPLY WITH APPLICABLE LAW, TO BE CONSISTENT WITH THE CITY OF NIAGARA FALLS STANDARDS AND IN AND IN ACCORDANCE WITH CURRENT GUIDELINES, CODES, REGULATIONS AND STANDARDS PRESCRIBED BY THE CITY OF NIAGARA FALLS.
11. ALL BOULEVARD AREAS TO BE RESTORED WITH #1 NURSERY SOD ON A MINIMUM 150mm OF TOPSOIL.
12. ALL TRENCH BACKFILL UNDER EXISTING ROADWAYS SHALL BE COMPACTED IN MINIMUM 230mm LIFTS TO 98% STANDARD PROCTOR DENSITY. A GEOTECHNICAL ENGINEER'S REPRESENTATIVE SHALL BE ON SITE DURING THE WORK TO VERIFY THE COMPACTION OF EACH LIFT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS OF RE-TESTING.

ROADWORKS:

1. ROADWAYS & RELATED WORKS SHALL BE DESIGNED AND CONSTRUCTED SO AS TO COMPLY WITH APPLICABLE LAW, TO BE CONSISTENT WITH THE CITY OF NIAGARA FALLS STANDARDS AND IN ACCORDANCE WITH THE CURRENT GUIDELINES CODES, REGULATIONS AND STANDARDS PRESCRIBED BY THE CITY OF NIAGARA FALLS.
2. CATCH BASIN CONNECTIONS TO BE PVC SDR35 PIPE CSA B182.4 SINGLE CATCH BASIN LEADS TO BE MIN. 250mm DIA. DOUBLE CATCH BASIN LEADS TO BE MIN. 300mm DIA. REAR LOT CATCHBASIN LEADS AND DITCH INLET LEADS TO BE CSA A257.1 EXTRA STRENGTH CL3 CONC. MIN 250mm DIA.
3. SINGLE CATCH BASINS AS PER OPSD 705.010 FRAME AND COVER AS PER OPSD 400.010.
4. DOUBLE CATCH BASINS AS PER OPSD. 705.020. FRAME AND COVER AS PER OPSD 400.010.
5. FINAL ROADWAY CROSSFALL TO BE 2.0%
6. VALVES, MANHOLES AND CATCH BASINS SHALL BE PLACED AT ASPHALT BINDER COURSE (HL4) ELEVATION AS DIRECTED BY THE ENGINEER.
7. AT SAG POINTS, CATCH BASIN ADJUSTMENT AND PAVING TO BE PLACED IN SUCH MANNER THAT WILL NOT OBSTRUCT DRAINAGE.
8. FINAL ASPHALT COURSE (HL3) SHALL BE PLACED IN ACCORDANCE WITH APPROVED CITY OF NIAGARA FALLS STANDARDS FOR TIMING, AS DIRECTED BY THE ENGINEER AND AS PER THE REQUIREMENTS STIPULATED BY THE CITY OF NIAGARA FALLS.
9. FOR MANHOLE AND CATCH BASIN TOP ADJUSTMENTS, ALL PERMANENT ADJUSTMENTS ARE TO BE POURED IN PLACE OR APPROVED EQUIVALENT (e.g. MODULOC).
10. ALL BEDDING AND BACKFILL MATERIAL, ROAD SUB-GRADES AND GRANULAR ROAD BASES SHALL BE COMPACTED TO MIN 100% SPD UNLESS OTHERWISE SPECIFIED.
11. SILTATION CONTROL BARRIERS SHALL BE PLACED AS DETAILED ON THE SILTATION AND EROSION CONTROL PLAN.
12. ADDITIONAL SILT CONTROL LOCATIONS MAY BE REQUIRED AS DETERMINED BY THE CITY OF NIAGARA FALLS AND/OR THE ENGINEER.
13. ALL CATCHBASINS AND DOUBLE CATCHBASINS IN DEPRESSIONS TO BE INSTALLED WITH 150mm# PERFORATED PVC SUBDRAINS 6.0m LONG EACH WAY (MIN). ALL REMAINING CATCHBASINS WILL BE INSTALLED WITH 150mm# PERFORATED PVC SUBDRAINS 6.0m LONG UP GRADIENT (MIN.) OR AS DIRECTED BY ENGINEER.
14. SAWCUT, REMOVE AND REPLACE ANY EXISTING CURB FOR ANY NEW DRIVEWAYS OR ANY EXISTING DRIVEWAYS THAT ARE TO BE ABANDONED.
15. SITE SERVICING WITHIN THE ROAD ALLOWANCE MUST BE PERFORMED BY THE DEVELOPERS CONTRACTOR UNDER A ROAD OCCUPANCY PERMIT ISSUED BY THE ENGINEERING.
16. SITE SERVICING WITHIN THE ROAD ALLOWANCE MUST BE APPROVED BY THE CITY WITH THE ISSUANCE OF A ROAD OCCUPANCY PERMIT.

GENERAL LEGEND:

- 100.00 — EXISTING ELEVATIONS
- S1 — EXISTING SANITARY MANHOLE
- ST1 — EXISTING STORM MANHOLE
- CB — EXISTING CATCHBASIN
- HGP — EXISTING HYDRO GUY POLE
- LS — EXISTING LIGHT STANDARD
- BELL PEDESTAL — EXISTING BELL PEDESTAL
- FH — EXISTING FIRE HYDRANT
- V&B — EXISTING VALVE & BOX
- SIB — EXISTING STANDARD IRON BAR
- MON — EXISTING MONUMENT
- EXISTING DITCH
- x — x — EXISTING CHAIN LINK FENCE
- S1 — PROPOSED SANITARY MANHOLE
- ST1 — PROPOSED STORM MANHOLE
- ST1 — PROPOSED CATCHBASIN MANHOLE
- CB — PROPOSED CATCHBASIN
- PROPOSED RAIN WATER LEADER (CONNECT TO U/G BUILDING STORM SERVICE)
- H&V — PROPOSED FIRE HYDRANT & VALVE
- V&B — PROPOSED VALVE & BOX
- 75m FIRE HYDRANT COVERAGE
- PROPOSED HYDRO TRANSFORMER
- PROPOSED LIGHT STANDARD

WATERMAINS:

1. WATERMAINS AND RELATED APPURTENANCES SHALL BE DESIGNED AND CONSTRUCTED SO AS TO COMPLY WITH THE CITY OF NIAGARA FALLS STANDARD PRACTICES.
2. WATERMAINS TO BE INSTALLED WITH A MINIMUM DEPTH OF COVER OF 1.70m BELOW FINISHED GRADE.
3. WATERMAINS TO BE INSTALLED IN ACCORDANCE WITH OPSD 802.010 TYPE 2. TRENCH BEDDING TO BE BEDDING GRANULAR 'A' UNLESS OTHERWISE NOTED.
4. WATERMAINS TO BE PVC DR 18 IN ACCORDANCE WITH AWWA C900 CLASS 150. THE PIPE SHALL BE SHIPPED TO THE SITE WITH THE ENDS FACTORY CAPPED.
5. FOR PVC WATERMAIN DEFLECTION:
   - MAXIMUM ALLOWABLE DEFLECTION OF 1 DEGREE PER JOINT SHALL NOT BE EXCEEDED.
   - EACH JOINT SHALL BE DEFLECTED AN EQUAL AMOUNT.
6. ALL WATER MAINS TO BE SWABBED, TESTED, DISINFECTED AND FLUSHED UNDER THE SUPERVISION OF THE ENGINEER TO THE SATISFACTION OF THE CITY OF NIAGARA FALLS PRIOR TO CONNECTION TO THE EXISTING MUNICIPAL SYSTEM. REFER TO OPSS 701.07.25, AWWA C651 & CITY OF NIAGARA FALLS GENERAL WATERMAIN DISINFECTION PROCEDURES.
7. A REDUCED PRESSURE DOUBLE BACKFLOW PREVENTER AND WATER METER ARE REQUIRED ON THE TEMPORARY SUPPLY LINES USED FOR FILLING AND FLUSHING/SWABBING OF WATERMAINS.
8. UPON COMPLETION OF INSTALLATION, THE CONTRACTOR SHALL PERFORM A PRESSURE TEST ON THE WATERMAINS AS PER OPSS 701.07.24 AND CITY OF NIAGARA FALLS SPECIFICATIONS. WATERMAIN IS TO BE TESTED UNDER THE SUPERVISION OF THE ENGINEER PRIOR TO CONNECTION TO EXISTING WATERMAINS USING TEMPORARY CAPS OR PLUGS.
9. PIPE CLOSURES WHERE REQUIRED, ARE TO BE SUPPLIED BY THE CONTRACTOR. THE CONTRACTOR SHALL ALSO SUPPLY AND INSTALL ALL ADAPTOR PIECES IN ORDER TO CONNECT EXISTING WATERMAINS.
10. ALL WATER SERVICE CONNECTIONS 25mm DIA. ASTM B88 TYPE 'K' SOFT COPPER WITH SAND BEDDING.
11. WATER SERVICES TO BE LOCATED AS PER TYPICAL SERVICING DETAIL ON THIS SHEET WITH A "SMALL TYPE" CURB STOP AS PER TYPICAL DETAIL. CURB STOPS TO BE SUPPLIED WITH STAINLESS STEEL RODS AND COTTER PINS AND AN ELECTRICAL GROUNDING CLAMP.
12. ALL VALVE BOXES TO BE SET TO PROPOSED ASPHALT BINDER COURSE (HL4) ELEVATION. VALVE BOXES ARE TO BE ADJUSTED TO FINAL SURFACE ASPHALT ELEVATION WHEN FINAL ASPHALT COURSE IS PLACED.
13. ALL WATER VALVES TO BE CITY OF NIAGARA FALLS APPROVED.
14. ALL FIRE HYDRANTS TO BE CITY OF NIAGARA FALLS APPROVED. FIRE HYDRANTS TO BE INSTALLED AS PER CITY OF NIAGARA FALLS SPECIFICATIONS.
15. ANCHOR BLOCKS FOR WATERMAINS AS PER OPSD 1103.01 AND OPSD 1103.02. JOINT RESTRAINERS WITH A MINIMUM LENGTH OF 1.2m ON EACH SIDE OF 45° BENDS PERMITTED. JOINT RESTRAINERS TO BE MEGA-LUG FOR PVC SERIES 2000PV OR APPROVED EQUAL.
16. ALL FIRE HYDRANTS SHALL CONFORM TO THE AREA MUNICIPALITY FIRE DEPARTMENT'S REQUIREMENTS. ALL HYDRANTS WITHIN DEVELOPMENT SHALL BE OF LIKE MANUFACTURE.
17. TRACING WIRES TW#@ GAUGE TO BE TERMINATED / ACCESSIBLE AT A TEST BOX AT ALL HYDRANTS AND PLACED ALONG TOP OF WATERMAIN AND FASTENED WITH STRAPS AT 6.0m CENTRES. TRACING WIRE SHALL NOT BE LOOPED TO THE SURFACE AT MAINLINE VALVE BOXES.
18. CATHODIC PROTECTION TO BE PROVIDED AT ALL VALVES, BENDS AND FITTINGS WITH 11.0 KG ZINC ANODES AND ON ALL WATER SERVICE CONNECTIONS WITH 5.5 KG ZINC ANODES.
19. WATERMAIN INSULATION TO BE PROVIDED AT ALL LOCATIONS WHERE THE WATERMAIN IS LOCATED CLOSE TO CATCH BASINS (LESS THAN 0.9m) AND AT CONNECTIONS TO EXISTING WATERMAINS WHERE DEPTH OF COVER IS INSUFFICIENT (LESS THAN 1.70m).
20. THE WATERMAIN AND HYDRANT LEADS AT THE HIGH POINTS SHOULD BE CONSTRUCTED SO THAT THE HYDRANT LEADS SLOPE SLIGHTLY UPWARD FROM THE WATERMAIN TO THE HYDRANT TO OPTIMIZE THE HYDRANTS AS AIR RELIEF POINTS.
21. EVERY NEW WATER SERVICE SHALL BE SERVICED WITH A WATER METER IN ACCORDANCE WITH CITY OF NIAGARA FALLS SPECIFICATIONS. THE WATER METER FEE SHALL BE PAID BY THE OWNER PRIOR TO ISSUANCE OF THE BUILDING PERMIT. THE ROUGHING AND INSTALLATION OF THE METER SHALL CONFORM TO THE REQUIREMENTS OF THE CITY WATER AND PUBLIC WORKS DEPARTMENTS.
22. WATER SERVICES TO BE INSTALLED TO MAIN UTILIZING MAINSTOPS WITH SERVICE SADDLES.

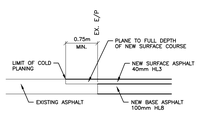
SANITARY & STORM SEWERS:

1. SANITARY & STORM SEWERS & RELATED APPURTENANCES SHALL BE DESIGNED AND CONSTRUCTED SO AS TO COMPLY WITH APPLICABLE LAW, TO BE CONSISTENT WITH THE CITY OF NIAGARA FALLS STANDARDS AND IN ACCORDANCE WITH CURRENT GUIDELINES, CODES, REGULATIONS, BEST PRACTICES AND STANDARDS PRESCRIBED BY THE CITY OF NIAGARA FALLS.
2. COVER AND BEDDING MATERIAL FOR CONCRETE PIPE AS PER OPSD 802.030 CLASS 'B' BEDDING SHALL BE GRANULAR 'A' MATERIAL UNLESS OTHERWISE NOTED.
3. COVER AND BEDDING MATERIAL FOR PVC PIPE AS PER OPSD 802.010 TYPE 2 TRENCH BEDDING SHALL BE GRANULAR 'A' MATERIAL UNLESS OTHERWISE INDICATED.
4. PVC PIPE WILL REQUIRE SPECIAL CONSTRUCTION PROCEDURES FOR LEAKAGE AND TESTING, PIPE DEFLECTION, ETC.
5. ALL SEWERS TO BE FLUSHED & VIDEOED PRIOR TO THE SUBMISSION OF THE FIRST INTERIM COMPLETION CERTIFICATE AND PRIOR TO THE FINAL COMPLETION CERTIFICATE.
6. ALTERNATE MATERIALS MAY BE ACCEPTABLE, PROVIDED APPROVAL HAS FIRST BEEN OBTAINED FROM THE CITY OF NIAGARA FALLS AND ENGINEER IN WRITING.
7. SAFETY PLATFORMS AS PER OPSD 404.020.
8. DROP STRUCTURES AS PER OPSD 1003.010.
9. ALL STORM MANHOLES AND CATCHBASINS TO BE PRECAST CONCRETE STRUCTURES MANUFACTURED IN PRE QUALIFIED PLANTS IN ACCORDANCE WITH THE LATEST APPLICABLE ONTARIO PROVINCIAL STANDARD (OPS) DRAWINGS AND SPECIFICATIONS.
10. ALL SEWER AND CULVERT INSTALLATIONS TO CONFORM WITH OPSD 802.031 TYPE 3 SOIL.
11. ALL STORM MANHOLE FRAMES AND COVERS TO CONFORM WITH OPSD 401.010 TYPE 'B' OPEN COVER.
12. ALL SANITARY MANHOLE FRAMES AND COVERS TO CONFORM WITH OPSD 401.010 TYPE 'A' CLOSED COVER.
13. MANHOLES SHALL BE SUPPLIED TO THE SITE PRE-BENCHED UNLESS OTHERWISE NOTED.
14. PRIVATE SANITARY DRAINS TO BE 100mm# DR28 PVC PIPE, CSA B182.1 M-1983, RUBBER GASKET JOINT.
15. BEDDING FOR PRIVATE SANITARY & STORM DRAINS AS PER OPSD 1006.02 TYPE 2 TRENCH WITH GRANULAR 'A' BEDDING AND COVER MATERIAL.
16. MINIMUM FALL FOR PRIVATE SANITARY & STORM DRAINS TO BE 2.0%
17. EXFILTRATION (INFILTRATION) TESTING AND AIR TESTING OF THE SANITARY SEWER IS TO BE PERFORMED BY THE CONTRACTOR.
18. SANITARY SEWERS:
    - MAINLINE SANITARY SEWERS TO BE CSA B182.2 DR35 P.V.C. PIPE

    STORM SEWERS:
    - MAINLINE STORM SEWERS UP TO AND INCLUDING 450mm# TO BE CSA B182.2 DR35 P.V.C. PIPE, OR CSA A257.2 65-D CONCRETE PIPE.
    - 525mm# AND LARGER MAINLINE STORM SEWERS TO BE CSA A257.2 65-D CONCRETE PIPE
19. ALL RESIDENCES WILL REQUIRE SUMP PUMPS c/w "GOOSENECK" CONNECTIONS.
20. CONNECTION TO THE SANITARY OR STORM SEWER MAIN MUST BE WITH AN APPROVED PRE-FABRICATED TEE AND SLEEVES CUT IN TO THE MAIN.
21. CONNECTION TO THE SANITARY OR STORM SEWER MAIN MUST BE WITH AN APPROVED CORE AND INSERT TEE OR PRE-FABRICATED SADDLE ON THE MAIN.

MUD MAT DETAIL

N.T.S.

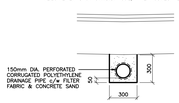


ASPHALT MILLING DETAIL

(N.T.S.)

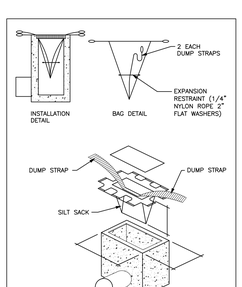
SUBDRAIN NOTES:

1. PERFORATED CORRUGATED POLYETHYLENE DRAINAGE PIPE SHALL MEET THE REQUIREMENTS OF O.P.S.S. 1840.
2. PIPE FILTER FABRIC CONFORMING TO O.P.S.S. 1860 FOR GEOTEXTILE CLASS 1 WITH A FILTRATION OPENING SIZE OF 150 to 450 MICRONS SHALL BE SUPPLIED ON ALL SECTIONS OF PERFORATED PIPE.
3. LAY PERFORATED PIPE WITH PERFORATIONS DOWNWARD.
4. CAP OPEN UPSTREAM ENDS OF PIPES.
5. SUBDRAIN PIPES TO BE SET ON AT LEAST 0.5% GRADE DRAINING TO A POSITIVE FROST-FREE OUTLET.
6. BEDDING AND BACKFILL MATERIAL SHALL BE CONCRETE SAND MEETING THE GRADATION REQUIREMENTS OF O.P.S.S. 1002, FINE AGGREGATE.



TYPICAL SUBDRAIN DETAIL

N.T.S.

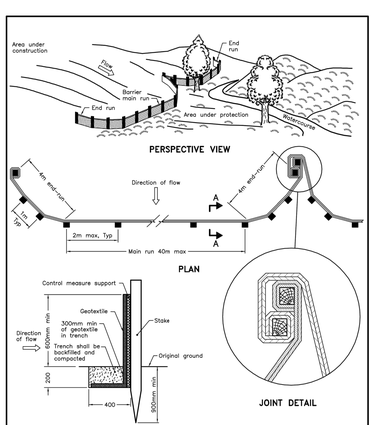


SILT SACK DETAIL

N.T.S.

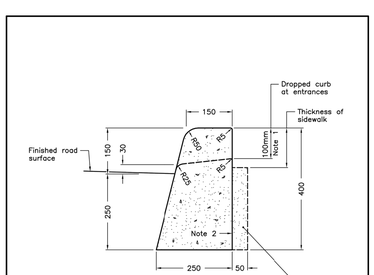
SWALE DETAIL

N.T.S.



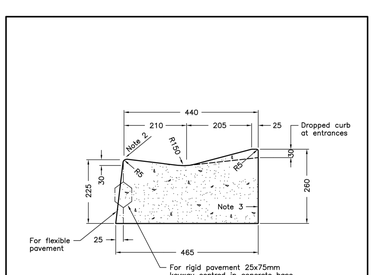
NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev. 2
HEAVY–DUTY SILT FENCE BARRIER		OPSD 219.130



NOTES:
1 When sidewalk is continuously adjacent, the dropped curb at entrances shall be reduced to 75mm.
2 For slipforming procedure a 5% batter is acceptable.
A Treatment at entrances shall be according to OPSD 351.010.
B Outlet treatment shall be according to the OPSD 610 Series.
C The transition from one curb type to another shall be a minimum length of 3.0m, except in conjunction with guide rail where it shall be according to the OPSD 900 Series.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev. 2
CONCRETE BARRIER CURB		OPSD 600.110



NOTES:
1 When curb and gutter is adjacent to concrete pavement or base, this drawing shall be used in conjunction with OPSD 552.010 and 552.020.
2 Flexible and composite pavement shall be placed 5mm above the adjacent edge of gutter.
3 For slipforming procedure a 5% batter is acceptable.
A Treatment at entrances shall be according to OPSD 351.010.
B Outlet treatment shall be according to the OPSD 610 Series.
C The transition from one curb type to another shall be a minimum length of 3.0m, except in conjunction with guide rail where it shall be according to the OPSD 900 Series.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev. 2
CONCRETE MOUNTABLE CURB WITH NARROW GUTTER		OPSD 600.100

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This drawing is not to be used for construction until signed and stamped by the designer.

No.	Date	Version	Dwn.

PROJECT:

PROPOSED MIXED USE DEVELOPMENT

7301 Lundy's Lane
City Of Niagara Falls
Canada

DRAWING TITLE:

TYPICAL DETAILS AND NOTES

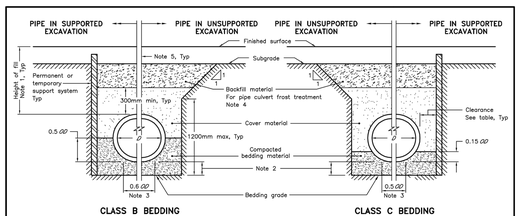
DRAWN BY: K.P.B. DATE: OCT. 5/23

CHECKED BY: R.W.P. SCALE: AS SHOWN

PROJECT NO.: 16364

DRAWING NO.: C-03

LICENSED PROFESSIONAL ENGINEERS
06/10/23
R. W. PHILLIPS
PROVINCE OF ONTARIO

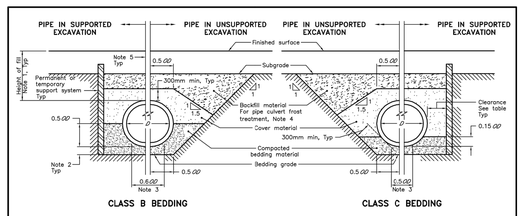


NOTES:
1 Height of fill is measured from the finished surface to top of pipe.
2 The minimum bedding depth below the pipe shall be 0.15 $\varnothing$ in no case shall this dimension be less than 150mm or greater than 300mm.
3 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
4 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
5 Condition of excavation is symmetrical about centreline of pipe.
A Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.
B All dimensions are in metres unless otherwise shown.

LEGEND:
$\varnothing$ – Inside diameter
$\varnothing\varnothing$– Outside diameter

CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 3
RIGID PIPE BEDDING, COVER, AND BACKFILL TYPE 1 OR 2 SOIL – EARTH EXCAVATION		
OPSD 802.030		



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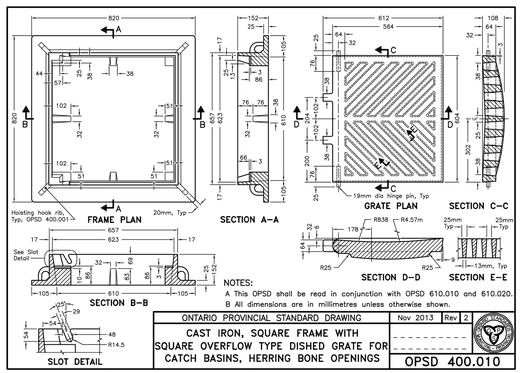
B All dimensions are in metres unless otherwise shown.

LEGEND:
$\varnothing$ – Inside diameter
$\varnothing\varnothing$ – Outside diameter

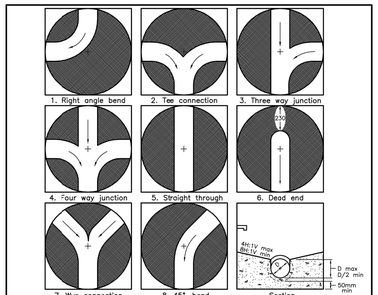
CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 3
RIGID PIPE BEDDING, COVER, AND BACKFILL TYPE 3 SOIL – EARTH EXCAVATION		
OPSD 802.031		



NOTES:
A This OPSD shall be read in conjunction with OPSD 610.010 and 610.020.
B All dimensions are in millimetres unless otherwise shown.

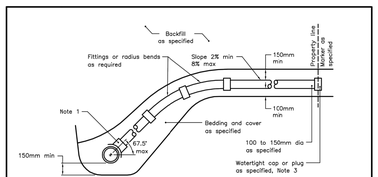
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev 2
CAST IRON, SQUARE FRAME WITH SQUARE OVERFLOW TYPE DISHED GRATE FOR CATCH BASINS, HERRING BONE OPENINGS		
OPSD 400.010		



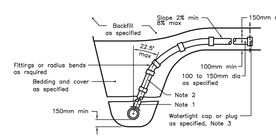
MAXIMUM SIZE HOLE IN THE WALL IN PRECAST RISER SECTIONS					
Maintenance Hole Diameter	No. 1–4	No. 5 and 6	No. 8	No.7	
				Inlet Hole	Outlet Hole
1200	700	860	780	700	860
1500	860	1220	960	860	1170
1800	1220	1485	1220	1220	1485
2400	1485	2020	1760	1485	2020
3000	1930	2450	2300	1930	2450
3600	2470	3085	2730	2470	3085

NOTES:
1 Slopes shall be maintained from the outlet hole opening for top of benching.
A Concrete for benching shall be 30MPa.
B When benching is hand–finished, it shall be given wood float finish, channel shall be given steel trowel finish.
C Benching slope and height shall be as specified.
D When specified, maintenance holes that are 1200mm in diameter with a uniform channel for 200 or 250mm pipe may be prebenched at the manufacturer with standardized benching slope and channel orientation.
E All dimensions are nominal.
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 4
MAINTENANCE HOLE BENCHING AND PIPE OPENING ALTERNATIVES		
OPSD 701.021		



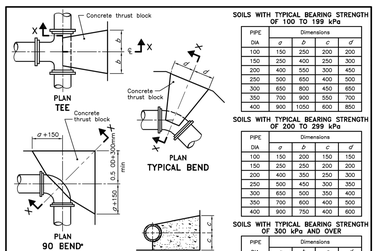
CONNECTION WITHOUT VERTICAL RISER



CONNECTION WITH VERTICAL RISER

NOTES:
1 Sewer service connections to the main pipe sewer shall be made using factory made tees, strap–on–saddles, or other approved saddles.
2 Vertical risers shall be as specified.
3 Cap or plug at property line shall be adequately braced.
A Maintenance holes shall be used at the main sewer to connect service connections greater than or equal to 300mm.
B For new construction, saddles shall be installed on the main pipe before that pipe is laid.
C Approved cut–in tool shall be used for field made connections.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2011	Rev 2
SEWER SERVICE CONNECTIONS FOR RIGID MAIN PIPE SEWER		
OPSD 1006.010		



SOILS WITH TYPICAL BEARING STRENGTH OF 100 TO 199 kPa

PIPE DIA	Dimensions a	b	c	d
100	150	250	200	200
150	250	400	250	300
200	400	550	300	450
250	500	650	400	500
300	650	800	450	650
350	700	900	550	700
400	900	1050	600	850

SOILS WITH TYPICAL BEARING STRENGTH OF 200 TO 299 kPa

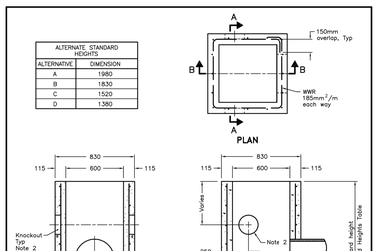
PIPE DIA	Dimensions a	b	c	d
100	150	200	150	150
150	250	250	200	200
200	400	350	250	300
250	500	450	300	350
300	650	500	350	400
350	700	600	400	500
400	900	750	400	600

SOILS WITH TYPICAL BEARING STRENGTH OF 300 kPa AND OVER

PIPE DIA	Dimensions a	b	c	d
100	150	150	150	150
150	250	200	200	200
200	400	300	200	250
250	500	400	250	300
300	650	450	300	300
350	700	550	350	350
400	900	650	350	450

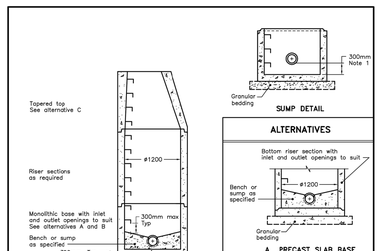
NOTES:
A Concrete shall be placed to within 50mm of the face of the bell.
B Bond breaker shall be used between concrete and fittings.
C The above thrust block dimensions meet or exceed the MCE Watermain Design Criteria for Future Alterations Authorized Under a Drinking Water Works Permit.
D The assumptions made for the above calculations are:
– Maximum operating pressure of 690 kPa,
– Maximum surge pressure with a flow velocity change of 0.6 m/s of 790 kPa for Class 52 DI pipe and 240 kPa for PVC pipe.
E The tables apply to both ductile iron and PVC pipe. When one length exceeded the other, the longer length was used.
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev 2
CONCRETE THRUST BLOCKS FOR TEES, PLUGS, AND HORIZONTAL BENDS		
OPSD 1103.010		



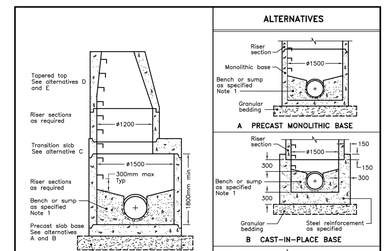
NOTES:
1 Outlet hole size 525mm diameter maximum, location as required.
2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
A Centre reinforcing in base slab and walls ±20mm.
B Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.
C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.
D Pipe support shall be according to OPSD 708.020.
E All dimensions are nominal.
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3
PRECAST CONCRETE CATCH BASIN 600x600mm		
OPSD 705.010		



NOTES:
1 The sump is measured from the lowest invert.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, or 701.032.
C Structure exceeding 5.0m in depth shall include safety platform according to OPSD 404.020.
D Pipe support according to OPSD 708.020.
E For benching and pipe opening details, see OPSD 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 5
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER		
OPSD 701.010		



NOTES:
1 For sump detail, see OPSD 701.010.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, 701.040, 701.041, 703.011, 703.021, and 706.010.
C Structures exceeding 5.0m in depth shall include safety platform according to OPSD 404.020 or 404.021.
D Pipe support shall be according to OPSD 708.020.
E For benching and pipe opening details, see OPSD 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 5
PRECAST CONCRETE MAINTENANCE HOLE 1500mm DIAMETER		
OPSD 701.011		

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No.	Date	Version	Dwn.

PROJECT:
PROPOSED MIXED USE DEVELOPMENT
7301 Lundy's Lane
City Of Niagara Falls
Canada

DRAWING TITLE:
TYPICAL DETAILS AND NOTES

DRAWN BY: K.P.B. DATE: OCT. 5/23
CHECKED BY: R.W.P. SCALE: AS SHOWN
PROJECT NO.: 16364
DRAWING NO.: C-04

LICENSED PROFESSIONAL ENGINEER
06/10/23
R. W. PHILLIPS
PROVINCE OF ONTARIO