

UPDATED 4/2013

SPECIFICATIONS

EXCEPT AS MODIFIED BY THESE PLANS AND THE DETAIL SPECIFICATIONS PERTAINING THERETO, ALL WORK ON THIS PROJECT SHALL BE GOVERNED (IN ORDER) BY THE REQUIREMENTS OF THE CITY OF SYLVANIA, LUCAS COUNTY ENGINEER AND BY THE CURRENT STATE OF OHIO DEPARTMENT OF TRANSPORTATION, CONSTRUCTION AND MATERIAL SPECIFICATION AND ANY SUPPLEMENTAL STATE SPECIFICATIONS AS MAY BE IN EFFECT FOURTEEN (14) CALENDAR DAYS PRIOR TO THE AWARD OF THIS CONTRACT. IN THE AFORESAID STATE SPECIFICATIONS, THE WORDS "STATE", "DIRECTOR", AND "ENGINEER" SHALL BE HELD TO MEAN THE CITY OF SYLVANIA, OR ITS DULY APPOINTED REPRESENTATIVE.

ALL MATERIAL SHALL BE MANUFACTURED IN THE UNITED STATES OF AMERICA. COPIES OF SUPPLIERS INVOICES SHALL BE SUBMITTED TO THE CITY OF SYLVANIA.

ROOF DRAINS

ROOF DRAINS, FOUNDATION DRAINS AND OTHER CLEAN WATER CONNECTIONS TO THE SANITARY SEWER ARE PROHIBITED (PART NINE - STREETS, UTILITIES AND PUBLIC SERVICE CODE, CHAPTER 929 - SEWER REGULATIONS, SECTION 929.19, ORD. 106-77, PASSED 12-7-1977).

SEWER-WATERLINE SEPARATION

SANITARY SEWER AND MANHOLE INSTALLATIONS SHALL BE LAID WITH AT LEAST TEN (10) FEET HORIZONTAL AND EIGHTEEN (18) INCHES VERTICAL SEPARATION FROM ANY WATERLINE MEASURED EDGE TO EDGE.

EXISTING SEWERS

EXCEPT AS OTHERWISE PROVIDED IN THESE PLANS, FLOW IN EXISTING STORM AND SANITARY SEWERS SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION OF THIS PROJECT.

THE EXISTING SEWERS AND CATCH BASINS ARE TO BE REPLACED IMMEDIATELY IF DAMAGED DURING CONSTRUCTION BY CONDUIT OF EQUAL STRENGTH AND A CATCH BASIN OF EQUAL CONSTRUCTION. THESE REPLACEMENTS, IF NECESSARY, ARE TO BE CONSIDERED PAID FOR IN THE UNIT PRICE BID FOR THE INSTALLATION OF THE PROPOSED SANITARY SEWER. DITCHES ARE TO BE REGRADED TO DRAIN PROPERLY.

CONNECTIONS TO EXISTING SEWERS

WHERE THE PLANS PROVIDE FOR THE PROPOSED CONDUIT TO BE CONNECTED TO, OR TO CROSS EITHER OVER OR UNDER AN EXISTING SEWER, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE THE EXISTING PIPE BOTH AS TO LINE AND GRADE BEFORE STARTING CONSTRUCTION OF THE PROPOSED SEWER.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING SEWERS RESULTING FROM OPERATION OR NEGLIGENCE.

CROSSING OF EXISTING PIPES AND UTILITIES

WHERE THE PLANS PROVIDE FOR A PROPOSED CONDUIT TO CONNECT TO, OR CROSS OVER OR UNDER AN EXISTING CONDUIT OR FACILITY, THE CONTRACTOR SHALL LOCATE THE EXISTING CONDUIT OR FACILITY BOTH AS TO LINE AND GRADE BEFORE STARTING TO LAY ANY PORTION OF THE PROPOSED CONDUIT WHICH COULD BE AFFECTED BY THE LOCATION OF THE EXISTING CONDUIT OR FACILITY.

IF THE CONTRACTOR DETERMINES THAT THE ELEVATION OF AN EXISTING CONDUIT, OR FACILITY TO BE CONNECTED TO, DIFFERS FROM THE PLAN ELEVATION OR NECESSITATES A CHANGE IN THE PROPOSED CONDUIT SLOPE, THE CITY SHALL BE NOTIFIED BEFORE STARTING CONSTRUCTION OF ANY PORTION OF THE PROPOSED CONDUIT WHICH WILL BE AFFECTED BY THE VARIANCE IN THE EXISTING ELEVATION.

IF THE CONTRACTOR DETERMINES THAT THE PROPOSED CONDUIT WILL INTERSECT AN EXISTING CONDUIT OR FACILITY IF CONSTRUCTED AS SHOWN ON THE PLANS, THE ENGINEER SHALL BE NOTIFIED BEFORE STARTING CONSTRUCTION OR ANY PORTION OF THE PROPOSED CONDUIT WHICH WOULD BE AFFECTED BY THE INTERFERENCE WITH AN EXISTING CONDUIT OR FACILITY.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADDITIONAL COSTS RESULTING FROM FAILURE TO COMPLY WITH THIS NOTE.

PAYMENT FOR ALL THE OPERATIONS DESCRIBED ABOVE SHALL BE INCLUDED IN THE CONTRACT PRICE FOR THE PERTINENT 603 CONDUIT ITEM.

SANITARY SEWER PIPE

ALL PIPE FOR SANITARY SEWER SHALL HAVE PREMIUM JOINTS AND SHALL BE EITHER ITEM 706.02 (REINFORCED PIPE), OR ITEM 706.45 POLYVINYL CHLORIDE (PVC) SEWER PIPE AND FITTINGS CONFORMING TO A.S.T.M. D-3034-SDR35.

IF TYPE "B" OR "C" CONDUIT IS SPECIFIED, THE CONTRACTOR MAY USE POLYVINYL (PVC) SEWER PIPE AND FITTINGS, A.S.T.M. (AMERICAN SOCIETY FOR TESTING AND MATERIALS) D-3034-SDR35. THE PIPE AND FITTINGS SHALL BE MADE OF PVC PLASTIC HAVING A CELL CLASSIFICATION OF 12454-B AS DEFINED IN SPECIFICATION D-1784. COMPOUNDS THAT HAVE DIFFERENT CELL CLASSIFICATIONS BECAUSE ONE OR MORE PROPERTIES ARE SUPERIOR TO THOSE OF THE SPECIFIED COMPOUNDS ARE ALSO ACCEPTABLE.

18" DIA. AND LARGER P.V.C. PIPE SHALL BE IN ACCORDANCE WITH A.S.T.M. F-679, PS-115, SOLID WALL PIPE.

PIPE SPECIALS

QUANTITIES FOR PIPE BENDS, TEES, WYES, PLUGS AND OTHER FITTINGS ARE LISTED ON THE PLANS FOR THE CONVENIENCE OF THE CONTRACTOR. THE COST OF ALL PIPE SPECIALS FOR ALL TYPES OF PIPE SHALL BE INCLUDED IN THE UNIT PRICE BID PER FOOT FOR THE PERTINENT CONDUIT ITEM.

SANITARY MANHOLES

FOR SEWERS WITH A DIAMETER OF 36 INCHES OR LESS, STANDARD TYPE 2, TYPE 3 DROP AND SPECIAL MANHOLES SHALL BE CONSTRUCTED WITH APPROVED PRECAST CONCRETE SECTIONS CONFORMING IN GENERAL TO A.S.T.M. C-478.

PRECAST REINFORCED CONCRETE RISER RINGS AND DOMES SHALL COMPLY WITH THE REQUIREMENTS OF ITEM 706.02 EXCEPT FOR MINIMUM DESIGNS AND MARKING. MINIMUM WALL THICKNESS SHALL BE 5 INCHES AND CIRCULAR REINFORCEMENT SHALL BE A MINIMUM OF 0.18 SQ. IN. PER FOOT. CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 4,000 LBS. PER SQUARE INCH.

1 ½ INCH HOLES FOR HANDLING MAY BE CAST INTO DOMES AND RINGS.

THE CONNECTION BOX FOR PRECAST MANHOLES ON SEWERS 42 INCHES AND OVER IN DIAMETER SHALL BE REINFORCED AS SPECIFIED AND SHOWN ON THE DETAIL SHEETS. CONCRETE FOR THE MANHOLE BASE, CONNECTION BOX AND INVERT SHALL BE CLASS "C", MEETING REQUIREMENTS OF ODOT ITEM 499.

SANITARY MANHOLES (CONTINUED)

THE FOLLOWING SHALL BE CLEARLY STENCILED OR IMPRESSED ON EACH RISER RING:

- A. M.H. NUMBER OR STATION AND OFFSET.
- B. THE DATE OF MANUFACTURE
- C. THE NAME OR TRADE-MARK OF THE MANUFACTURER AND LOCATION OF THE PLANT.

CONNECTIONS FOR LATERAL SEWERS INCLUDING DROPS AND LEADS, EXCEPT PIPE INCLUDED IN ITEM 603 WILL BE CONSIDERED A PART OF ALL MANHOLES. MINIMUM DROP PIPE DIAMETER FOR SANITARY SEWER MANHOLES SHALL BE 6 INCHES. A DROP PIPE SHALL BE PROVIDED FOR A SEWER ENTERING A MANHOLE AT AN ELEVATION OF 24 INCHES OR MORE ABOVE THE MANHOLE INVERT.

OPENINGS FOR THE INLET AND OUTLET SEWER PIPE SHALL BE DRILLED OR CAST IN THE PRECAST RING AND SHALL BE FITTED WITH A GASKETED WATER-TIGHT CONNECTION, KOR-N-SEAL BOOT OR APPROVED EQUAL, TO PREVENT INFILTRATION. ALL MANHOLES SHALL BE CONSTRUCTED WITH A PROPERLY INSTALLED BENCH AND ALL INVERTS FILLED AND SEALED TO AVOID DEBRIS BUILD-UP.

SANITARY SEWER MANHOLES SHALL HAVE FLEXIBLE WATERTIGHT JOINTS, USING RUBBER GASKETS FOR SEALING THE JOINTS CONFORMING IN GENERAL TO A.S.T.M. C-443. THE JOINTS SHALL BE OF SUCH DESIGN AS WILL PERMIT PLACEMENT WITHOUT APPRECIABLE IRREGULARITIES IN THE INTERIOR WALL SURFACE OF THE MANHOLE. ACCEPTABLE 48 INCH DIAMETER JOINTS SHALL BE OF THE "O" RING GASKET TYPE OR APPROVED EQUAL.

ACCESS THROUGH MANHOLES SHALL BE BY MEANS OF STEPS MEETING THE REQUIREMENTS OF ITEM 604 - OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATIONS. ADDITIONALLY, THE CITY OF SYLVANIA WILL REQUIRE ALL CONTRACTORS TO USE APPROPRIATE FALL EQUIPMENT WHEN ACCESSING MANHOLES.

MANHOLE SECTIONS MAY BE REPAIRED, IF NECESSARY, BECAUSE OF OCCASIONAL IMPERFECTIONS IN MANUFACTURE OR ACCIDENTAL DAMAGE DURING HANDLING AND WILL BE ACCEPTABLE IF, IN THE OPINION OF THE CITY OF SYLVANIA, THE REPAIRS ARE SOUND AND PROPERLY FINISHED AND CURED AND THE REPAIRED MANHOLE SECTIONS CONFORM TO THE REQUIREMENTS OF A.S.T.M. C-478.

ADJUSTING RINGS SHALL BE PRECAST-REINFORCED CONCRETE WITH ONE NO. 3 GAGE WIRE OR EQUIVALENT. THERE SHALL BE A MINIMUM OF 4 INCHES, MAXIMUM OF 12 INCHES. ALTERNATIVELY, THE CITY WILL ACCEPT CONTRACTOR USE OF THE "MR. MANHOLE" LEVELING SYSTEM IN LIEU OF PRECAST-REINFORCED ADJUSTING RINGS. THE CONTRACTOR MUST BE A STATE OF OHIO CERTIFIED INSTALLER OF THIS SYSTEM FOR USE ON ANY PROJECT.

THE ENTIRE OUTER SURFACE OF ADJUSTING RINGS AND MANHOLE CASTINGS SHALL RECEIVE A SMOOTH PLASTER COAT OF ½ INCH MINIMUM PORTLAND CEMENT MORTAR UNLESS OTHERWISE DETAILED ON THE DRAWINGS OR DIRECTED BY THE CITY OF SYLVANIA.

WHEN THE MANHOLE IS LOCATED WITHIN THE PAVEMENT AREA, THE BACKFILL MATERIAL SHALL BE GRANULAR MATERIAL AND IT SHALL BE TAMPED IN PLACE AND THEN INUNDATED. THE GRANULAR MATERIAL SHALL MEET THE REQUIREMENTS SPECIFIED IN THE PLAN NOTES FOR BACKFILLING.

MANHOLE CASTINGS

STANDARD CAST IRON MANHOLE FRAME AND COVER SHALL BE EAST JORDAN IRON WORKS 2020 OR APPROVED EQUAL. THE COMBINED WEIGHT SHALL NOT BE LESS THAN 485 LBS. WITH VENTED LID. IN PAVEMENT AREAS, OR WHERE REQUIRED, OR NOTED ON DETAIL PLANS, PROVIDE A SOLID LID. IN PAVEMENT AREAS, AFTER THE CASTING IS SET TO GRADE, A CIRCULAR AREA WITH A WIDTH OF 12 INCHES SHALL BE NEATLY CUT AWAY DOWN TO THE BEARING OF THE FLANGE OF THE CASTING. THE EXCAVATED AREA AROUND THE CASTING SHALL THEN BE FILLED AND COMPACTED TO ¼ INCH BELOW THE NEW SURFACE WITH "CLASS C", MEET REQUIREMENTS OF ODOT ITEM 499.

ALL CASTINGS MUST:

BE POURED IN A CLOSED MOULD AND SHALL BE TRUE TO PATTERN.

BE FREE OF BLOWS, POROSITY, BURRS AND OTHER DEFECTS AND SHALL NOT UNDER ANY CIRCUMSTANCES BE PLUGGED.

BE OF A GOOD GRADE OF MACHINABLE GREY IRON USED IN COMMERCIAL CASTINGS.

ALL BEARING BASES SHALL BE MACHINED WHEN USED BY TRAFFIC.

IF CASTINGS ARE DELIVERED TO THE JOB UNPAINTED, THEY SHALL BE GIVEN ONE COAT OF ASPHALT VARNISH OR COAL-TAR PITCH PAINT BY THE CONTRACTOR.

SANITARY SERVICE CONNECTIONS

ALL SANITARY SERVICE CONNECTIONS SHALL BE PROPERLY PLUGGED AND SUITABLY STAKED AT THE END OF THE SERVICE CONNECTION PLUG, WITH A PRESSURE TREATED 2"x4"x8' BOARD PAINTED GREEN. STAKE SHALL BE A MINIMUM 4 FEET ABOVE PLUG TO AID IN FUTURE LOCATION OF SERVICE CONNECTION. THE COST OF LABOR AND MATERIALS FOR INSTALLATION TO BE INCLUDED IN THE UNIT PRICE BID FOR THE CONDUIT.

ALL SANITARY SEWER CONNECTIONS CONSTRUCTED FOR EXISTING BUILDINGS WITH BASEMENTS SHALL BE A MINIMUM OF 3 FEET BELOW THE BASEMENT FLOOR ELEVATION AT THE PROPERTY LINE. IF THE PROPERTY IS A VACANT LOT, THE CONNECTION SHALL BE A MINIMUM OF 8 FEET BELOW THE PAVEMENT ELEVATION AT THE PROPERTY LINE. ANY DEVIATION FROM THE ABOVE MINIMUM STANDARDS WILL BE SHOWN ON THE PLANS AND SHALL BE APPROVED BY THE CITY OF SYLVANIA.

EXCEPT AS OTHERWISE NOTED, ALL CROSS-OVER TAPS SHALL HAVE A MINIMUM GRADE OF 1%.

WHERE THE DEPTH OF THE MAIN SEWER, AT A SERVICE CONNECTION, IS OVER 12 FEET, A RISER SHALL BE REQUIRED AS SHOWN ON THE PLANS. THE RISER SHALL BE CONSTRUCTED IN CONFORMANCE WITH THE SANITARY RISER DETAIL INCLUDED IN THESE SPECIFICATIONS.

RISER SHALL BE 6" IN DIAMETER OR AS INDICATED ON PLANS. ALL RISERS SHALL BE ENCASED WITH A 12" SONATUBE AND BACKFILLED WITH ITEM 304 AGGREGATE.

SANITARY SERVICE CONNECTIONS (CONTINUED)

ALL SERVICE CONNECTIONS SHALL BE PAINTED "GREEN" AT END OF PIPE. COLOR SHALL BE IN ACCORDANCE WITH O.S.H.A. SPECIFICATION 1010.144, APPROVED SAFETY COLOR.

QUANTITIES FOR RISERS, CROSS-OVERS, AND SERVICE CONNECTIONS HAVE BEEN CALCULATED FOR THE STANDARD SANITARY RISER DETAIL. IF THE CONTRACTOR, WITH THE APPROVAL OF THE CITY OF SYLVANIA, ELECTS TO USE AN ALTERNATE RISER, IT SHALL BE AT NO ADDITIONAL COST TO THE PROJECT.

SANITARY SEWER INSPECTION

ALL WORK PERFORMED WITHIN THE SCOPE OF THIS PROJECT IS SUBJECT TO THE INSPECTION AND APPROVAL OF THE CITY OF SYLVANIA.

THE SANITARY SEWER SHALL BE VISUALLY INSPECTED FROM MANHOLE TO MANHOLE TO ASSURE CORRECT ALIGNMENT AND ABSENCE OF LEAKS. SEWER PIPE INVERT ELEVATIONS WILL BE CHECKED FROM MANHOLE TO MANHOLE. SEWERS WITH GRADES LESS THAN DESIGN GRADES ARE SUBJECT TO REJECTION. THE FOLLOWING TABLE IS THE MAXIMUM ALLOWABLE DEVIATION OF THE CONSTRUCTED CENTER OF THE SANITARY SEWER FROM MANHOLE TO MANHOLE FROM THE STRAIGHT LINE DESIGN BETWEEN THE TWO MANHOLES.

CONDUIT INSIDE DIAMETER	MAXIMUM ALLOWABLE DEVIATION FROM DESIGN CENTER OF CONDUIT
8"	2"
10" - 12"	3"
15"	4"
18" - 24"	5"

THE MAXIMUM SPACING BETWEEN MANHOLES SHALL BE 350 FEET, UNLESS SPECIFIED OTHERWISE ON THE DETAIL PLANS.

THE CONSTRUCTION OF ANY PART OF THE SANITARY SEWER INCLUDING MANHOLES AND STRUCTURES OUTSIDE THE PERMANENT RIGHT-OF-WAY/OR THE PERMANENT SANITARY SEWER EASEMENT WILL NOT BE ACCEPTED BY THE CITY OF SYLVANIA.

INSTALLATION

THE PIPE SHALL BE LAID ON A PROPERLY SHAPED AND FIRM BEDDING OF THE TYPE SPECIFIED AND MEETING REQUIREMENTS OF ITEM 603.06 OF THE CURRENT ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS. WHERE CONDITIONS WARRANT, UNSUITABLE MATERIAL SHALL BE REMOVED AND GRANULAR MATERIAL CONFORMING TO THE SPECIFICATION SHALL BE USED FOR BEDDING.

ALL PIPE AND APPURTENANCES SHALL BE INSTALLED TRUE TO LINE, GRADE AND LOCATION, WITH JOINTS CENTERED, SPIGOTS HOME AND PROPER SUPPORT AND BLOCKING PROVIDED. CARE SHALL BE USED TO LAY THE PIPE SO THAT IT IS SUPPORTED AND BEDDED THE FULL LENGTH OF THE BARREL.

WHEN NO BEDDING CLASS IS SPECIFIED, THE REQUIREMENTS FOR TYPE 2 BEDDING SHALL APPLY.

TYPE 2 BEDDING SHALL CONSIST OF A BED OF GRANULAR STONE MATERIAL (ITEM 703.11, TYPE 1, ITEM 304) OR TYPE 3 (NO. 57 OR 67 AGGREGATE) HAVING A THICKNESS OF AT LEAST 6 INCHES BELOW THE BOTTOM OF THE PIPE AND EXTENDING UP AROUND THE PIPE FOR A DEPTH OF NOT LESS THAN 30% OF THE RISE OF THE CONDUIT. THE LAYER OF BEDDING MATERIAL SHALL BE SHAPED TO FIT THE CONDUIT FOR AT LEAST 10% OF THE VERTICAL DIAMETER OF THE CONDUIT AND SHALL HAVE RECESSES SHAPED TO RECEIVE THE BELL OF BELL-AND-SPIGOT PIPE.

FOR PVC PIPE, THE GRANULAR BEDDING SPECIFIED ABOVE SHALL EXTEND A MINIMUM OF 12" ABOVE THE TOP OF THE PIPE.

TYPE 3 BEDDING SHALL CONSIST OF A NATURAL FOUNDATION WITH RECESSES SHAPED TO RECEIVE THE BELL AND BELL-AND-SPIGOT PIPE. SCARIFY AND LOOSEN THE MIDDLE ONE THIRD OF THE PIPE SPAN.

BACKFILLING

ALL TRENCHES AND EXCAVATIONS SHALL BE BACKFILLED IMMEDIATELY AFTER PIPE IS LAID THEREIN. NO MATERIAL SHALL BE USED FOR BACKFILLING THAT CONTAINS STONES, ROCK OR PIECES OF MASONRY, FROZEN EARTH, DEBRIS OR EARTH WITH AN EXCEPTIONALLY HIGH VOID CONTENT.

TRENCHES OUTSIDE THE LIMITS OF 5 FEET FROM THE BACK OF CURB OR EDGE OF PAVEMENT OR PAVED BERM SHALL BE BACKFILLED WITH THOROUGHLY TAMPED GRANULAR MATERIAL, A MINIMUM OF 12 INCHES ABOVE THE TOP OF THE PIPE. THE REMAINDER OF THE TRENCH MAY BE FILLED WITH EXCAVATED MATERIAL, INSOFAR AS IT IS OF SUITABLE CHARACTER.

TRENCHES UNDER PAVEMENT OR PAVED BERM AND TO THE LIMITS OF 5 FEET OUTSIDE THE BACK OF THE CURB OR EDGE OF PAVEMENT SHALL BE BACKFILLED WITH THOROUGHLY TAMPED GRANULAR MATERIAL TO THE PAVEMENT SUBGRADE. GRANULAR BACKFILL SHALL CONFORM TO THE GRADATION REQUIREMENTS OF THE CURRENT SPECIFICATIONS FOR ITEM 703.11, TYPE 1, ITEM 304.

IF BACKFILL IS SAND, A MINIMUM THICKNESS OF 8" GRANULAR BACKFILL, ITEM 703.11, TYPE 1, ITEM 304 SHALL BE PLACED ABOVE THE PIPE BEDDING TO PREVENT PIPING.

GRANULAR MATERIAL MAY BE COMPACTED WITH WATER IF SATISFACTORY DRAINAGE IS PROVIDED FOR THE FREE WATER. WHEN COMPACTING WITH WATER, THE GRANULAR MATERIAL MAY BE PLACED IN LAYERS NOT TO EXCEED 8 INCHES LOOSE DEPTH AND EACH LAYER THOROUGHLY SATURATED WITH WATER BY FLOODING OR JETTING. PRIOR TO THE PLACEMENT OF SOIL OVER THE GRANULAR MATERIAL THE EXCESS WATER SHOULD BE DRAINED.

SANITARY GENERAL NOTES

CITY OF SYLVANIA

DESIGNED	CHECKED	1 3
JES	KGA	

MANHOLE TESTING

TEST EACH MANHOLE AFTER ASSEMBLY AND AFTER ALL LIFT HOLES HAVE BEEN PLUGGED WITH NON-SHRINK GROUT AND, AT CONTRACTOR'S OPTION, BEFORE OR AFTER COMPLETING BACKFILLING.

TEST BY DRAWING A VACUUM ON THE MANHOLE USING EQUIPMENT SPECIFICALLY DESIGNED FOR SUCH TESTING.

PLUG AND BRACE PIPES ENTERING THE MANHOLE TO PREVENT BEING DRAWN INTO THE MANHOLE.

PLACE A TEST HEAD WITH NECESSARY GAUGES AND CONNECTIONS AT THE INSIDE OF THE TOP OF THE CASTING AND SEAL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

DRAW A VACUUM OF 10 INCHES OF MERCURY AND THEN SHUT THE VACUUM PUMP OFF. WITH VALVES CLOSED, MEASURE THE TIME FOR THE VACUUM TO DROP TO 9 INCHES. THE TEST SHALL BE SUCCESSFUL IF THE TIME MEASURED MEETS OR EXCEEDS THE VALUES INDICATED IN THE FOLLOWING TABLE:

MINIMUM TEST TIMES IN SECONDS						
MANHOLE DEPTH	MANHOLE DIAMETER *					
	48"	60"	72"	84"	96"	108"
8' OR LESS	20	26	33	40	48	56
10'	25	33	41	50	58	67
12'	30	39	49	59	69	79
14'	35	46	57	68	80	92
16'	40	52	65	77	91	104
18'	45	59	73	87	102	116
20'	50	65	81	97	113	129
22'	55	72	89	106	123	140
24'	59	78	97	116	135	152
26'	64	85	105	125	148	168
28'	69	91	113	135	157	179
30'	74	98	121	144	168	192

* WHEN THERE IS A TRANSITION, ADD THE TIMES FOR EACH SIZE BASED ON THE DEPTH ASSOCIATED WITH EACH SIZE.

TESTING REQUIREMENTS FOR SANITARY SEWERS

FOR FLEXIBLE SANITARY SEWER PIPE, FIVE PERCENT (5%) IS THE MAXIMUM ALLOWABLE DEFLECTION. THE DEFLECTION TEST CAN BE RUN BY USE OF A RIGID BALL OR MANDREL, WHOSE DIAMETER IS EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE, PULLED THROUGH THE SEWER LINE. A DEFLECTION TEST WILL BE PERFORMED THREE TO SIX MONTHS AFTER BACKFILLING. UNLESS OTHERWISE DIRECTED BY THE CITY, ALL PVC PIPE WILL BE TESTED FOR DEFLECTION.

AFTER THE PIPE HAS BEEN LAID, BACKFILLED AND DEFLECTION TESTED (WHERE APPLICABLE), COMPLETE LEAKAGE TESTS SHALL BE CONDUCTED ON THE ENTIRE LENGTH OF THE PROJECT BETWEEN MANHOLES, SUCH TESTS SHALL BE CONDUCTED WITH A REPRESENTATIVE OF THE CITY PRESENT. ALSO, PRIOR TO CONDUCTING LEAKAGE TESTS, THE CONTRACTOR SHALL MAKE A DETERMINATION OF GROUND WATER LEVEL BY INSTALLING GROUND WATER GAUGES IN MANHOLES AS SELECTED BY THE CITY. THESE GAUGES SHALL CONSIST OF A RIGID SECTION OF ½ INCH DIAMETER PIPE, APPROXIMATELY 10 INCHES LONG, INSERTED HORIZONTALLY THROUGH THE MANHOLE WALL AS NEAR AS POSSIBLE TO THE CROWN OF THE PIPE, WITH ANY OPENING AROUND THE PIPE SEALED SO AS TO BE WATERTIGHT, AND A CLEAR PLASTIC TUBE ATTACHED TO THE PIPE WITHIN THE MANHOLE AND EXTENDED VERTICALLY TO THE TOP OF THE MANHOLE. PRIOR TO CONNECTING THE TUBE, AIR SHALL BE BLOWN THROUGH THE PIPE WITH SUFFICIENT PRESSURE TO CLEAR THE LINE. UPON SATISFACTORY COMPLETION OF THE TESTS, THE GROUND WATER GAUGES SHALL BE REMOVED AND THE OPENINGS IN THE MANHOLE WALLS NEATLY AND PERMANENTLY CLOSED WITH A NON-SHRINK AND NON-METALLIC GROUT.

WHEN THE CROWN OF THE PIPE IS COVERED WITH TWO FEET OR MORE OR WATER AT THE HIGHEST POINT IN THE TEST SECTION, AN INFILTRATION TEST SHALL BE CONDUCTED. SHOULD GROUND WATER NOT PROVIDE SUFFICIENT HEAD, THE CONTRACTOR SHALL FLOOD THE TRENCH WITHIN THE TEST SECTION, BULKHEADING EACH END OF THE SECTION, TO OBTAIN OR MAINTAIN THE SPECIFIED EXTERNAL HEAD, OR AN AIR TEST OR EXFILTRATION TEST SHALL BE CONDUCTED.

IN ADDITION, FOR ALL MAIN LINE SEWERS 8 INCHES THROUGH 30 INCHES IN DIAMETER TESTED BY INFILTRATION OR EXFILTRATION, AIR TESTS SHALL BE CONDUCTED FOR THE PURPOSE OF TESTING SERVICE CONNECTIONS EVEN WHEN THE CROWN OF THE PIPE IS COVERED WITH TWO FEET OR MORE OF WATER. FOR SUCH TESTS, THE INTERNAL AIR PRESSURE SHALL NEVER EXCEED 5.0 PSI, AND THE ACCEPTABILITY OF THE TESTS SHALL BE BASED ON THE MINIMUM HOLDING TIME SUBSEQUENTLY SPECIFIED FOR THE SIZE OF THE MAIN LINE SEWER.

IN ALL CASES, FOR ANY TEST SECTION FAILING TO MEET THE LIMITS OF THE SPECIFICATIONS, THE CONTRACTOR SHALL BE REQUIRED TO LOCATE AND REMEDY THE DEFECTS CAUSING THE FAILURE AND THE SECTION SHALL BE RETESTED AND REPAIRS OR REPLACEMENT CONTINUED UNTIL THE LIMITS OF THE SPECIFICATIONS ARE SATISFIED. SHOULD A TEST FAIL DUE TO OTHER THAN A LEAKING PLUG, A CLOSED CIRCUIT TELEVISION INSPECTION OF THE TEST SECTION SHALL BE CONDUCTED TO DETERMINE THE CAUSE OF THE FAILURE. WHEN THE FAILURE IS THE RESULT OF A LEAKING JOINT(S), THE JOINT SHALL BE EXCAVATED AND REPAIRED. THE CITY SHALL BE FURNISHED VIDEO TAPES OF ALL TELEVISION INSPECTIONS. THE CONTRACTOR SHALL PAY ALL COSTS FOR INSPECTION.

ALL VISIBLE LEAKAGE IN SEWERS AND MANHOLES SHALL BE REPAIRED, EVEN THOUGH TESTS MAY HAVE BEEN SATISFACTORY.

ALL PLUGS USED DURING LEAKAGE TESTS SHALL BE OF A LENGTH AT LEAST EQUAL TO THE DIAMETER OF THE PIPE BEING TESTED TO ENSURE A WATERTIGHT SEAL. PNEUMATIC PLUGS FOR AIR TESTING SHALL BE ABLE TO RESIST INTERNAL TEST PRESSURES WITHOUT REQUIRING EXTERNAL BLOCKING.

INFILTRATION TESTS

THE LENGTH OF SEWER SUBJECT TO EACH TEST SHALL BE THE DISTANCE BETWEEN TWO ADJACENT MANHOLES AS A MINIMUM, BUT SHALL BE LEFT TO THE DISCRETION OF THE CITY. NO TEST SHALL EXCEED 900 FEET. THE TEST SECTION SHALL BE ISOLATED AND ALL SERVICE CONNECTIONS AND STUBS WITHIN THE SECTION SHALL BE CAPPED OR PLUGGED TO PREVENT THE ENTRY OF GROUND WATER. THE INFILTRATION SHALL BE MEASURED BY A V-NOTCH WEIR LOCATED IN THE DOWNSTREAM MANHOLE. THE TEST HEAD SHALL BE MAINTAINED FOR NOT LESS THAN 24 HOURS BEFORE A WEIR MEASUREMENT IS MADE. THE MAXIMUM ALLOWABLE LEAKAGE, INCLUDING MANHOLES, SHALL BE 100 GALLONS PER INCH OF DIAMETER PER MILE OF PIPE PER DAY.

EXFILTRATION TESTS

THE LENGTH OF SEWER SUBJECT TO AN EXFILTRATION TEST SHALL BE THE DISTANCE BETWEEN TWO ADJACENT MANHOLES AS A MINIMUM, BUT SHALL BE LEFT TO THE DISCRETION OF THE ENGINEER. NO TEST SHALL EXCEED 900 FEET. THE INLETS OF THE UPSTREAM AND DOWNSTREAM MANHOLES SHALL BE CLOSED WITH WATERTIGHT PLUGS AND THE TEST SECTION FILLED WITH WATER UNTIL THE ELEVATION OF THE WATER IN THE UPSTREAM MANHOLE IS TWO FEET ABOVE THE CROWN OF THE PIPE IN THE LINE BEING TESTED, OR TWO FEET ABOVE THE EXISTING GROUND WATER IN THE TRENCH, WHICHEVER IS HIGHER. A STANDPIPE MAY BE USED INSTEAD OF THE UPSTREAM MANHOLE FOR PROVIDING THE PRESSURE HEAD WHEN APPROVED BY THE ENGINEER. EXFILTRATION SHALL BE MEASURED BY DETERMINING THE AMOUNT OF WATER REQUIRED TO MAINTAIN THE INITIAL WATER ELEVATION FOR ONE HOUR FROM THE START OF THE TEST. WITH ABSORPTIVE PIPE, THE ONE HOUR PERIOD SHALL BEGIN AFTER ALLOWING THE WATER TO STAND FOR A MINIMUM OF 45 MINUTES TO ALLOW FOR SATURATION OF THE PIPE. THE MAXIMUM ALLOWABLE LEAKAGE, INCLUDING MANHOLES, SHALL BE 100 GALLONS PER INCH OF DIAMETER PER MILE OF PIPE PER DAY.

AIR TESTS

AFTER BACKFILLING, AIR TESTS SHALL BE CONDUCTED BETWEEN TWO CONSECUTIVE MANHOLES. PRIOR TO CONDUCTING AIR TESTS ON AIR PERMEABLE PIPE, THE WALLS OF THE PIPE SHALL BE DAMPENED. DAMPENING OF THE PIPE WALLS AND OBSTRUCTION TESTING MAY BE ACCOMPLISHED AT THE SAME TIME BY PROPELLING A SNUG FITTING INFLATED BALL OR OTHER APPROVED DEVICE THROUGH THE PIPE WITH WATER.

FOR SEWERS 30 INCHES IN DIAMETER AND SMALLER, EACH END OF THE SECTION TO BE TESTED AND ALL PIPE OUTLETS IN THE SECTION SHALL BE PLUGGED WITH SUITABLE TEST PLUGS. ONE PLUG USED AT A MANHOLE SHALL HAVE AN INLET TAP OR OTHER PROVISION FOR CONNECTING AN AIR HOSE FROM THE AIR SUPPLY EQUIPMENT. THE EQUIPMENT SHALL INCLUDE VALVES TO CONTROL THE RATE AT WHICH AIR FLOWS INTO THE TEST SECTION AND PRESSURE GAUGES WITH MINIMUM GRADUATIONS OF 0.1 PSI AND AN ACCURACY OF ±0.04 PSI TO MONITOR THE AIR PRESSURE WITHIN THE TEST SECTION.

AIR PRESSURE SHALL BE APPLIED SLOWLY TO THE TEST SECTION UNTIL THE PRESSURE REACHES 4.0 PSI, PLUS AN ADJUSTMENT OF 0.433 PSI FOR EACH FOOT OF GROUND WATER ABOVE THE CROWN OF THE PIPE BEING TESTED. INTERNAL AIR PRESSURE, INCLUDING ADJUSTMENT FOR GROUND WATER, SHOULD NEVER EXCEED 5.0 PSI.

WHEN PRESSURE REACHES 4.0 PSI, PLUS ADJUSTMENT FOR GROUND WATER, THE AIR SUPPLY SHALL BE THROTTLED SO THAT THE INTERNAL PRESSURE IS MAINTAINED BETWEEN 4.0 AND 3.5 PSI FOR AT LEAST TWO MINUTES TO PERMIT TEMPERATURE STABILIZATION. WHEN THE PRESSURE HAS STABILIZED AND IS AT OR ABOVE 3.5 PSI, THE AIR SUPPLY SHALL BE DISCONNECTED AND A STOP WATCH STARTED AND ALLOWED TO RUN UNTIL THE PRESSURE HAD DROPPED 1.0 PSI.

THE PERMISSIBLE TIME ALLOCATED FOR THE 1.0 PSI PRESSURE DROP SHALL BE CALCULATED ON THE BASIS OF THE DIAMETER AND LENGTH OF MAIN SEWER TESTED AND NO ADJUSTMENT SHALL BE MADE FOR SERVICE CONNECTIONS INCLUDED IN THE TEST SECTION. THE AIR TEST FOR A SECTION SHALL BE CONSIDERED ACCEPTABLE IF THE TIME ELAPSED FOR THE 1.0 PSI PRESSURE DROP IS EQUAL TO OR GREATER THAN THE TIME INDICATED, AND SHALL BE CONSIDERED UNACCEPTABLE IF THE ELAPSED TIME IS LESS THAN THAT INDICATED IN THE FOLLOWING TABLE:

MINIMUM TEST TIMES IN MINUTES REQUIRED FOR 1.0 PSI PRESSURE DROP (MIN:SEC)								
PIPE DIAMETER	LENGTH OF MAIN LINE TESTED							
	100'	150'	200'	250'	300'	350'	400'	450'
4"	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6"	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8"	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10"	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12"	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15"	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18"	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21"	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24"	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27"	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48

* TIME FOR INTERMEDIATE LENGTHS SHALL BE INTERPOLATED.

THE CONTRACTOR MAY AIR TEST SECTIONS BEFORE BACKFILLING THE TRENCH AS A CHECK FOR DEFECTS AND WORKMANSHIP. SUCH TESTS ARE AT THE OPTION OF THE CONTRACTOR AND ARE NOT A SUBSTITUTE FOR TESTS REQUIRED AFTER BACKFILLING HAS BEEN COMPLETED.

FOR SEWERS OVER 30 INCHES IN DIAMETER, INDIVIDUAL AIR TESTS AT JOINTS, LIFT HOLES, AND TEE OR WYE CONNECTIONS, ALONG WITH VISUAL INSPECTION SHALL BE CONDUCTED. MINIMUM TEST HOLDING TIME SHALL BE BASED ON A LEAKAGE RATE OF 0.003 CFM LOSS PER SQUARE FOOT OF INTERNAL SURFACE BEING TESTED.

SHOULD ANY SECTION OF THE CONDUIT FAIL TO MEET THE ABOVE TEST REQUIREMENTS, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE TELEVISION INSPECTION AND TO PROVIDE NECESSARY CORRECTIONS. THE COST OF ALL MATERIALS, LABOR AND INCIDENTALS NECESSARY FOR PERFORMING THE TESTS AND MAKING THE CORRECTIONS AND REPLACEMENTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PERTINENT CONDUIT ITEM, INCLUDING ANY WATER AND ALL EQUIPMENT NECESSARY.

MAINTENANCE BOND

THE CONTRACTOR SHALL PROVIDE A ONE YEAR MAINTENANCE BOND IN THE AMOUNT OF 25% OF THE CONSTRUCTION COST UPON COMPLETION OF THE PROJECT. THE COST OF THIS MAINTENANCE BOND SHALL BE INCLUDED WITH THE UNIT COST OF THE PERTINENT BID ITEMS.

—WHERE THE EXISTING PAVEMENT SURFACE AND/OR BASE IS DAMAGED OR UNDERMINED AS DETERMINED BY THE ENGINEER, REPLACEMENT OR RESURFACING AS DETAILED BELOW SHALL BE REQUIRED.

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BACKFILL SHALL MEET CURRENT
O.D.O.T. SPECIFICATIONS ITEM 603.80
AND 703.11, TYPE 1 (ITEM 304).
GRADATION AND COMPACTION TESTING
SHALL BE REQUIRED BY THE CITY OF
SYLVANIA. BACKFILL SHALL BE
PLACED IN 8" LIFTS.

DRIVEWAY REPLACEMENT DETAILS
N.T.S.



BORING DETAIL
N.T.S.

