

SECTION 33 3100 - SANITARY

- 1. SANITARY SEWER MAIN SHALL BE 8" DIAMETER, PVC SEWER PIPE, ASTM D 3034, SDR 35 WITH RUBBER RING GASKETED JOINTS. SEWER PIPE SHALL BE LAD TIED TO LINE AND GRADE WITH NO DEVIATION FROM TRUE LINE AND GRADE GREATER THAN 1/4".

- NEENAH CO. PRODUCTS SHALL BE QUALITY STANDARD. PROVIDE CASTINGS OF UNIFORM QUALITY, FREE FROM BLOW HOLES, POROSITY, HARD SPOTS, SHRINKAGE DEFECTS, CRACKS, OR OTHER NUROUS DEFECTS. GRAY IRON MATERIAL, ASTM A818, CLASS 30. ALL NON-ROCKING DESIGN WITH MACHINED BEARING SURFACES. PROVIDE TRAPS OR PIPE ELBOW DROPS IF SHOWN ON DRAWINGS.

SECTION 02722 - SANITARY SEWERS

- 1.1 QUALITY ASSURANCE
A. ALL WORK SHALL BE IN COMPLIANCE WITH LOCAL REGULATIONS.
1.2 SUBMITTALS
A. PRODUCT DATA
1. PIPING
2. MANHOLE STRUCTURE
3. MANHOLE FRAME AND COVER
PART 2 - PRODUCTS
2.1 SANITARY SEWER PIPING
A. SANITARY SEWER PIPING MAY BE ONE OF THE FOLLOWING AT THE CONTRACTORS OPTION UNLESS NOTED OTHERWISE ON THE DRAWINGS.

- NO. 4 90-100
NO. 8 75-100
NO. 16 50-85
NO. 30 25-60
NO. 50 10-30
NO. 100 1-10
NO. 200 (WET) 0-3
PART 3 - EXECUTION
3.1 STRUCTURES
A. PRECAST UNITS (RD) IN GRAVEL, SET LEVEL AND PLUMB. ALIGN STEPS IN ALL SECTIONS EXACTLY ON A PLUMB AXIS, ON SLOPING SURFACES, ARRANGE FOR OPENING TO BE ON THE DOWNSLOPE SIDE OF THE STRUCTURE SO THAT 12" MINIMUM COVER IS MAINTAINED OVER RISER SECTION WITHOUT BACKING THE PLANE OF THE SLOPE. FINISHED STRUCTURE, INCLUDING ALL JOINTS AND PENETRATIONS, SHALL BE WATERTIGHT.
B. MASONRY EXTENSIONS: CONSTRUCT AS DETAILED. PARGE INSIDE AND OUT. CASTINGS: SECURELY SET IN MORTAR.
3.2 INSTALLATION OF DRAIN LINES
A. ALL PIPE SHALL BE EXAMINED BEFORE LAYING AND NO PIECE SHALL BE INSTALLED WHICH IS FOUND TO BE DEFECTIVE.
DRAIN PLACEMENT SHALL COMMENCE AT THE OUTLET AND PROCEED SECTION BY SECTION "UPHILL" UNLESS OTHERWISE DIRECTED BY THE ENGINEER. PLACE SPOUT ENDS IN DIRECTION OF FLOW.
C. IF ANY DEFECTIVE PIPE IS DISCOVERED AFTER IT HAS BEEN INSTALLED, IT SHALL BE REMOVED AND REPLACED WITH A SOUND PIPE IN A SATISFACTORY MANNER AT NO ADDITIONAL COST TO THE OWNER. ALL PIPE AND FITTINGS SHALL BE THOROUGHLY CLEANED BEFORE INSTALLATION. SHALL BE KEPT CLEAN UNTIL THEY ARE USED IN THE WORK AND WHEN LAD, SHALL CONFORM TO THE LINES AND GRADES REQUIRED. ALL PIPES, LINED AND END SECTIONS AND FITTINGS SHALL BE INSTALLED IN ACCORDANCE WITH REQUIREMENTS OF THE MANUFACTURER, OR AS OTHERWISE PROVIDED HEREON ON THE DRAWINGS.
D. AS SOON AS THE EXCAVATION IS COMPLETE TO NORMAL GRADE OF THE BOTTOM OF THE TRENCH, SAND BEDDING SHALL BE PLACED, COMPACTED AND GRADED TO PROVIDE AN UNIFORM AND CONTINUOUS SUPPORT FOR THE PIPE. THE PIPE SHALL BE LAD ACCURATELY TO THE LINES AND GRADES INDICATED ON THE DRAWINGS. IN CONNECTION WITH THE BEDDING, THE PIPE SHALL BE PROVIDED EVENLY ON EACH SIDE OF THE PIPE TO MID-DIAMETER AND HAND TOOLS SHALL BE USED TO FORM THE BEDDING. SAND BEDDING SHALL BE PROVIDED CONTINUOUS SUPPORT FOR THE PIPE, DEPENDING ON FINAL SURFACE MATERIAL. SAND BEDDING OR COARSE AGGREGATE FILL SHALL BE PLACED TO 12" ABOVE THE TOP OF THE PIPE (REFER TO "DRAINS" DETAIL). THE INITIAL 3" OF BACKFILL ABOVE THE BEDDING SHALL BE PLACED IN 1" LAYERS AND CAREFULLY COMPACTED. GENERALLY THE COMPACT SHALL BE DONE EQUALLY ON EACH SIDE OF THE PIPE AND COMPACTOR EQUIPMENT SHALL NOT BE OPERATED DIRECTLY OVER THE PIPE UNITS. SUFFICIENT BACKFILL HAS BEEN PLACED TO ENSURE THAT SUCH COMPACTOR EQUIPMENT WILL NOT HAVE A DAMAGING EFFECT ON THE PIPE. EQUIPMENT USED IN COMPACTING THE INITIAL 3" OF BACKFILL SHALL BE APPROVED BY THE PIPE MANUFACTURER'S REPRESENTATIVE PRIOR TO USE. REFER TO SECTION 31 2301, SITEWORK EXCAVATION, BACKFILLING AND COMPACTING FOR ADDITIONAL BACKFILLING REQUIREMENTS.
E. ALL PIPE SHALL BE SOUND AND CLEAN BEFORE INSTALLATION. WHEN INSTALLATION IS NOT IN PROGRESS, THE OPEN ENDS OF THE PIPE SHALL BE CLOSED BY WATERTIGHT PLUG OR OTHER APPROVED MEANS. GOOD ALIGNMENT SHALL BE MAINTAINED DURING INSTALLATION. THE DEFLECTION AT JOINTS SHALL NOT EXCEED THAT RECOMMENDED BY MANUFACTURER.
BEFORE ANY JOINT IS MADE, THE PIPE SHALL BE CHECKED TO ASSURE THAT A CLOSE JOINT WITH THE NEXT ADJOINING PIPE HAS BEEN MAINTAINED AND THAT THE INVERTS ARE MATCHED AND CONTROL TO THE REQUIRED GRADE. THE PIPE SHALL NOT BE DRIVEN DOWN TO GRADE BY STRIKING IT.
PRECAUTIONS SHALL BE TAKEN TO PREVENT FLOTATION OF THE PIPE IN THE TRENCH.
H. WHEN MOVABLE TRENCH BRACING SUCH AS TRENCH BOXES, MOVABLE SHEETING, SHORING OR PLATES ARE USED TO SUPPORT THE SIDES OF THE TRENCH, CARE SHALL BE TAKEN IN PLACING AND MOVING THE BOXES OR SUPPORTING BRACING TO PREVENT MOVEMENT OF THE PIPE, OR DISTURBANCE OF THE PIPE BEDDING AND THE BACKFILL. TRENCH BOXES, MOVABLE SHEETING, SHORING OR PLATES SHALL NOT BE ALLOWED TO EXTEND BELOW TOP OF THE PIPE. IF TRENCH BOXES, MOVABLE SHEETING, SHORING OR PLATES HAVE BEEN INSTALLED BELOW THE TOP OF THE PIPE, THEY SHALL BE MOVED UPON TAKING CARE NOT TO DISTURB PIPE, BEDDING OR BACKFILL, AS TRENCH BOXES, MOVABLE SHEETING, SHORING OR PLATES ARE MOVED. PIPE BEDDING SHALL BE PLACED TO FILL ANY VOIDS CREATED AND THE BACKFILL SHALL BE RECOMPACTED TO PROVIDE UNIFORM SIDE SUPPORT FOR THE PIPE.
THOROUGHLY CLEAN COMPLETED STORM DRAINAGE SYSTEM OF ALL DEBRIS AND SEDIMENT PRIOR TO FINAL ACCEPTANCE.
3.3 COORDINATION
A. COORDINATE LOCATION OF WYES AND VERIFY INVERTS OF LINES AND STRUCTURES WITH PLUMBING CONTRACTOR WHERE APPLICABLE.
3.4 UNDERDRAINAGE/FRENCH DRAIN/LOW FLOW UNDERDRAIN
A. DRAINAGE FILL: PLACE AS DETAILED.
B. PERFORATED LINES: PLACE HOLES DOWN, TRUE TO LINE AND GRADE. PLACE REMAINING DRAINAGE FILL.
C. CONNECT TO NEAREST SUITABLE STORM MANHOLE WHETHER DRAWINGS SHOW ROUTING OR NOT.
D. BACKFILL PER SECTION 31 2301 SITEWORK EXCAVATION, BACKFILLING AND COMPACTING AND AS DETAILED ON THE DRAWINGS.
3.5 WATERPROOF PIPE CONNECTOR
A. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
END SECTION 33 4000

SECTION 33 4000 - STORM DRAINAGE

- PART 1 - GENERAL
1.1 SUBMITTALS
A. SUBMIT SHOP DRAWINGS (SD) AND MANUFACTURER'S DATA (MD) FOR THE ITEMS LISTED BELOW AND ANY SPECIAL CONSTRUCTION DETAILS RELATING TO THE STORM DRAINAGE SYSTEM
1. DRAINAGE STRUCTURES: ONE (SD) PER CASTING TYPE.
2. DRAINAGE STRUCTURES AND TRENCH DRAIN: ONE (SD) PER STRUCTURE. INCLUDE IRM AND BOTTOM ELEVATIONS, PIPE INVERTS AND PIPE LOCATIONS.
3. CASTINGS: ONE (SD) PER TYPE
4. STORM LINES AND UNDERDRAINS: ONE (PD) PER PIPE MATERIAL TYPE
5. FILTER FABRIC: (PD)
6. DETECTABLE WARNING TAPE: (PD)
7. NON-SHRINK GROUT: (SD)
B. MATERIAL CERTIFICATES (MC) INCLUDING A CERTIFIED LABORATORY SIEVE ANALYSIS (LA) BEARING NAME AND LOCATION OF QUARRY; SAMPLE (S) OF MATERIAL REQUIRED (APPROXIMATE VOLUME 1 CUBIC FOOT) IN A WATERPROOF CONTAINER PERMANENTLY LABELED TO SHOW SOURCE. SUBMIT FOR THE FOLLOWING MATERIALS:
1. DRAINAGE FILL (MC), (LA) AND (S)
2. COARSE AGGREGATE FILL (SEE SECTION 31201.1, SUBMITTALS)
PART 2 - PRODUCTS
2.1 MATERIALS
A. CONCRETE: AS SPECIFIED SECTION 32 1313 - SITE CONCRETE. MINIMUM COMPRESSIVE STRENGTH 3,000 PSI AT 28 DAYS.
B. REINFORCING: AS SPECIFIED SECTION 32 1313 - SITE CONCRETE.
C. MASONRY UNITS: COMMON BRICK, ASTM C-82, LATEST EDITION, GRADE SW
1. MORTAR: CEMENT:LINE-SAND 1:1:3 MIX.
D. DRAINAGE STRUCTURES, FRAME, GRATES AND COVERS:
1. DRYWELL/CATCH BASIN/MANHOLES/INLETS: SIZES, SHAPES, SPECIFIC UNIT, OR ANY OTHER SPECIAL REQUIREMENTS AS SHOWN ON DRAWINGS OR EQUAL. PRECAST REINFORCED CONCRETE UNITS COMPLYING WITH ASTM C 478 WITH INTEGRAL FLOOR OR POLYURETHANE CONCRETE BASE. YO-RING GASKETS FOR INTERLOCKING UNITS ASTM C443. PROVIDE DUCTILE IRON OR REINFORCED PLASTIC STEPS INTERNALLY CAST INTO SIDEWALLS WHERE INDICATED. USE ONLY "TRAFFIC DESIGN" COVERS IN PAVING AREAS OR WHERE OTHERWISE INDICATED.
E. FRAMES, GRATES, COVERS:
1. SIZES, SPECIFIC UNIT, GRATE OR COVER DESIGN OR ANY OTHER SPECIAL REQUIREMENTS AS SHOWN ON DRAWINGS OR EQUAL. ALL UNITS TO BE HEAVY-DUTY SUITABLE FOR H-20 LOADING. SYRACUSE CASTINGS CO. OR

- NO. 4 90-100
NO. 8 75-100
NO. 16 50-85
NO. 30 25-60
NO. 50 10-30
NO. 100 1-10
NO. 200 (WET) 0-3
PART 3 - EXECUTION
3.1 GENERAL
A. ESTABLISH AND MAINTAIN ALL LINES AND GRDES REQUIRED FOR THE PERFORMANCE OF THE WORK DESCRIBED IN THIS SECTION AND RELATE ALL ELEVATIONS TO DATUM ELEVATION INDICATED ON DRAWINGS.
B. INSTALL ALL PIPING IN ACCORDANCE WITH REFERENCED STANDARDS AND MANUFACTURER'S PRINTED INSTRUCTIONS.
C. LAY PIPING BEGINNING AT LOW POINT OF SYSTEM, TRUE TO GRADES AND ALIGNMENT INDICATED, WITH UNBROKEN CONTINUITY OF INVERT.
D. INSTALL ALL PVC PIPE IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM D 2321, "UNDERGROUND INSTALLATION OF FLEXIBLE THERMOPLASTIC SEWER PIPE".
3.2 PRECAST CONCRETE MANHOLES
A. USE EPOXY BONDING COMPOUND BETWEEN PRECAST SECTIONS AND WHERE MANHOLE STEPS ARE MORTARED INTO MANHOLE WALLS.
3.3 CLEANING OF SYSTEM
A. CLEAN SYSTEM OF ALL DEBRIS DURING AND AFTER CONSTRUCTION. KEEP SYSTEM CLEAR THROUGHOUT ALL PHASES OF CONSTRUCTION.
3.4 INSPECTION OF SYSTEM
A. INSPECT PIPING TO DETERMINE WHETHER LINE DISPLACEMENT OR OTHER DAMAGE HAS OCCURRED.
B. ALL PIPE SHALL BE TESTED FOR PRESSURE AND LEAKAGE IN ACCORDANCE WITH ALL LOCAL, REGIONAL AND STATE STANDARDS. PRESSURE AND LEAKAGE TESTING SHALL BE WITNESSED BY THE ENGINEER AND CERTIFIED TO THE APPROPRIATE MUNICIPALITIES. THE ENGINEER SHALL BE NOTIFIED AT LEAST 48 HRS IN ADVANCE OF ANY TESTING TO BE WITNESSED.
C. MAKE INSPECTIONS AFTER LINES BETWEEN MANHOLES HAVE BEEN INSTALLED AND APPROXIMATELY TWO FEET MINIMUM OF BACKFILL IS IN PLACE, AND AGAIN AT COMPLETION OF PROJECT.
D. IF INSPECTION INDICATES POOR ALIGNMENT, DEBRIS, DISPLACED PIPE, INFILTRATION OR OTHER DEFECTS, CORRECT SUCH DEFECTS TO THE SATISFACTION OF THE ARCHITECT/ENGINEER.
E. AT THE COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL PROVIDE AT LEAST ONE SET OF AS-BUILTS TO THE OWNER.
3.5 INSTALLATION OF WARNING TAPE
A. INSTALL CONTINUOUS PLASTIC UNDERGROUND WARNING TAPE DURING BACKFILLING OF TRENCHES FOR UNDERGROUND SEPTIC SYSTEM PIPING, STRUCTURES AND ELECTRICAL LINES. LOCATE 6" - 8" BELOW FINISH GRADE, DIRECTLY OVER PIPING AND ELECTRICAL LINES AND OVER EDGES OF UNDERGROUND STRUCTURES.
END OF SECTION 02722 - SANITARY SEWERS



UTILIZED FOR STORMWATER AND SANITARY DESIGN

FOR CONSTRUCTION
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Table with 4 columns: No, Rev, Description, Date. Contains revision history for the drawing.



Drawn By: VER
Checked By: SF
K&A Proj. No.: 31020
Date: DECEMBER 1, 2011
Scale: AS NOTED

Title: SPECIFICATIONS

L-801